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D E C E M B E R 1 9 9 1

FEDERAL PROFESSIONAL SERVICES MARKET

1991-1996

INPUT®

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**Federal Information Systems and Services
Program (FISSP)**

***Federal Professional Services Market,
1991-1996***


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Abstract

INPUT believes that the federal market demand for professional services—independent of services for systems integration, systems operations, and network services—will sustain a 7% compound annual growth rate in the FY 1991-1996 forecast period. This market is now expected to increase from \$1.9 billion in 1991 to \$2.7 billion in 1996. The market's growth is dependent on interoperability requirements, new technologies, and increasing Congressional pressures.

The federal professional services market will remain highly competitive and face increasing pressure from small-business and minority-owned firms, as well as aerospace firms. In addition, the market continues to be highly price sensitive, with progressively narrower margins and more tightly controlled overhead. This report analyzes agency plans for future use of professional services. It also discusses vendor status, future market plans, and selection criteria; vendor performance characteristics; contracting policy and preferences; and major contract opportunities in this period.

This report contains 202 pages and 57 exhibits, and is an update of a previous report of the same title.



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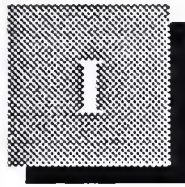
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Introduction

The Federal Government Professional Services Market, 1991-1996 is a revision of a report issued in December 1990. The report has been revised in response to continuing client interest in this changing market. The 1991 update identifies market issues and trends that impact professional services contractors and vendors entering the market through FY 1996. Insight into agency requirements and perceptions, and contractor guidance, are offered to help vendors plan their strategies to compete for federal professional services contracts.

INPUT prepared this report on professional services activities to be acquired by the federal government as part of INPUT's Federal Information Systems and Services Program (FISSP). Reports issued through this program are designed to assist INPUT's U.S. industrial clients in planning how to satisfy future federal government needs for computer-based information systems and services.

A

Scope

The period covered in the report is GFY 1991 through 1996. Vendor interviewees were selected because they were either identified as contractors of record for existing professional services contracts or listed as professional services vendors in INPUT's Vendor Analysis Program data base. The case studies of professional services projects were identified through INPUT Procurement Analysis Reports (PARs) or were suggested in conversations with clients. In order to obtain complete case study examples of awarded professional services projects, INPUT interviewed agency program managers and representatives of the prime contractor of record for specific projects.

For the purposes of the 1991 study, INPUT defines professional services as encompassing the following categories of vendor products and services (see Appendix B for detailed explanations of each category):

- Software Development

- Consulting Services
- Education and Training

This report excludes systems integration, systems operations (facilities management), and hardware maintenance after installation as product categories for professional services.

B

Methodology

The OMB/GSA Five-Year Plan analysis for the INPUT Procurement Analysis Report was reviewed for programs to be initiated during the GFY 1991-1996 period. INPUT also researched agency long-range plans for GFY 1991-1996 to identify significant spending changes and leading and lagging agencies for professional services opportunities.

The report findings are based on research and analyses of several sources, including:

- Federal agency GFY 1991 and GFY 1992 Information Technology Budgets
- OMB/GSA Five-Year Information Technology Plans for 1991-1996
- INPUT's Procurement Analysis Reports (PARs)
- Federal agency long-range IT plans
- Interviews of federal agency officials who manage existing professional services contracts
- Interviews of leading professional services contractors
- Interviews of prime contractors currently providing professional services

The contractor case study questionnaire was designed to acquire summary data on programs that have been awarded to professional services contractors. The questionnaires developed for agency officials and vendors for the earlier version of this report are also included in Appendix F. The objectives of the interviews were to:

- Acquire information about current experience and plans for future use of professional services from agency respondents
- Acquire information on industry status and future federal market plans
- Compare data from agencies and vendors about contracting policy and preferences, selection criteria, and vendor performance characteristics

Federal agency officials selected for interview in the current and previous editions of this report included:

- Contract officers
- Program managers

Industry representatives selected for interview in the current and previous editions of this report included:

- Marketing executives
- Technical executives
- Corporate executives
- Project/program managers of specific professional services contracts

The current versions of the Federal Information Resource Management Regulations, Federal Acquisition Regulations, Defense Acquisition Regulations (changes to FAR), and Multiple Award Schedule policy were investigated to identify changes that will impact professional services contracts and/or contract performance.

C

Report Organization

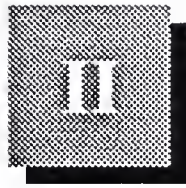
This report consists of five additional sections:

- Section II is an Executive Overview that describes the major points and findings in this report.
- Section III provides the market forecast and describes the major market issues and trends that impact the industry.
- Section IV summarizes federal agencies' requirements of professional services contractors and includes case study examples of professional services projects.
- Section V presents the vendors' perspectives on the federal professional services market.
- Section VI provides a sample of business opportunities presented by federal programs and initiatives that anticipate seeking the services of a professional services contractor.

Several appendixes are also provided:

- Interview Profiles
- Definitions
- Glossary of Acronyms
- Policies, Regulations, and Standards
- Related INPUT Reports
- Questionnaires

Following the appendixes is a description of INPUT and its programs and services.



Executive Overview

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A

Federal Market Pressures

The federal market for information technology professional services is expected to continue to grow over the next five years. Some of the pressures driving this growth are listed in Exhibit II-1. Government programs require steady improvement in both the quality and quantity of information technology support.

EXHIBIT II-1

Federal Market Pressures

- Improve productivity
- Technical staff shortage
- Budget deficit
- Contracting-out bias

In its drive to improve productivity, to do more with less, the federal government is growing increasingly reliant on information technology. At the same time, functional and pricing trends, especially in terms of hardware solutions and associated software, have opened new opportunities in government for using technology. For example, interest is mounting in many agencies to improve the management of spatially referenced data using geographic information systems (GIS). Also, agencies are turning toward image technology to solve the mountainous paper problems plaguing federal agencies. Effective use of these products to improve overall mission efficiency requires agencies to depend on the expertise of services vendors.

Agencies continue a heavy commitment to maintain and enhance existing systems, as well as develop new systems. Staff shortages effectively prevent in-house performance of these tasks. However, pressure to reduce the federal budget deficit increases the chances that some programs will be eliminated.

During the 1980s, the Reagan administration encouraged contracting out many formerly in-house activities, including professional services. The emphasis on OMB Circular A-76, as well as Executive Order 12615 ("Performance of Commercial Activities"), illustrates the bias toward contracting out. But most agencies have not contracted out professional services to any great degree; most of them seem to have quietly given lip service to Circular A-76.

Federal personnel policies support more use of professional services firms. Practically all agency executives that INPUT interviewed cited difficulty in hiring staff with strong technical credentials. Good candidates can usually obtain higher salaries in the private sector.

B

Market Forecast

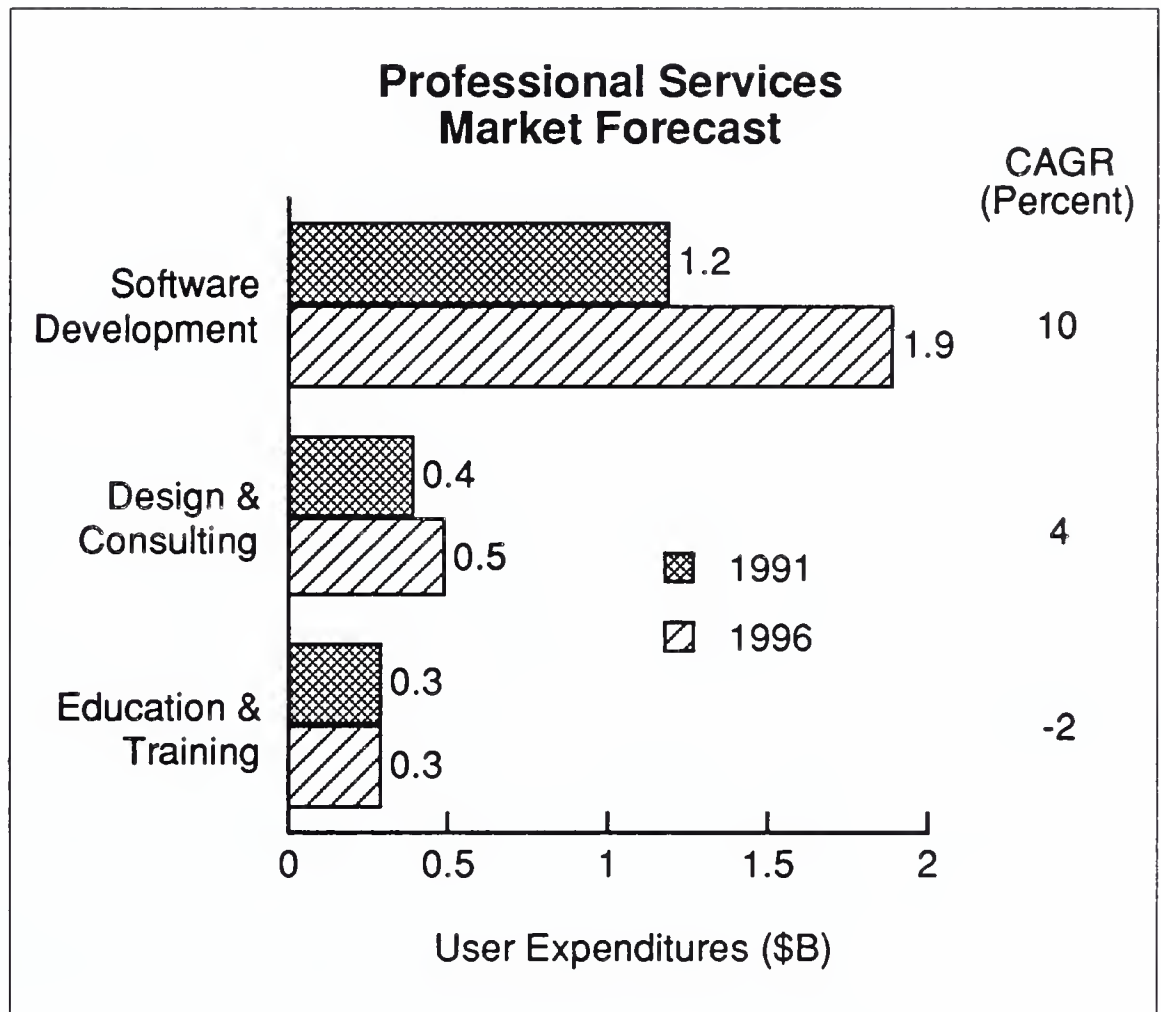
INPUT estimates that the federal professional services market will increase from \$1.9 billion in FY 1991 to \$2.7 billion by FY 1996, a compound annual growth rate of 7%. Exhibit II-2 gives a breakdown of the market into three subordinate areas.

The market size is somewhat lower than forecasted in previous years because INPUT no longer includes systems integration and systems operations in the professional services delivery mode.

Although the CAGRs are up for software development, and design and consulting services from those predicted in 1990, anticipated user expenditures are down. Education and training expenditures are expected to remain flat during the forecast period. INPUT's estimates of this market's growth potential are based on many factors. Interoperability needs, congressional pressures and the budget deficit are impacting all subdelivery modes of professional services.

Software development continues to be the biggest piece of professional services. However, the growing use of software packages, as well as agency policies encouraging their use, is holding down the increase in this category. The other categories are also growing more slowly, due primarily to a folding of these activities into systems integration.

Exhibit II-2



C

Key Application Areas

Professional services have supported and will continue to support a wide variety of application areas. Although DoD and civil agencies differ somewhat in their emphasis, the application areas of administration and data management dominate their responses, as shown in Exhibit II-3. Logistics support is also becoming more important as agencies move to automate supply and delivery processes.

Financial activities, along with logistics, compose the largest single set of applications. Other applications cover a range of information systems and appear unique to individual agencies. However, many agencies mention office automation, LANs, distributed processing, and centralized data base applications.

EXHIBIT II-3

Key Application Areas

- Administration and logistics
- Data management
- Financial
- Information systems
- Office automation

D**Key Vendors**

INPUT's listing of the top five professional services vendors is in Exhibit II-4. The list usually does not change significantly from year to year. CSC has retained its rank from INPUT's 1990 report. Rising to second place in 1990 is Grumman, reflecting its success in winning DLA's DLSC/DIDS contract for \$61 million. Unisys has dropped \$12 million in 1990 to fourth place, as a result of corporate restructuring and a depressed market.

EXHIBIT II-4

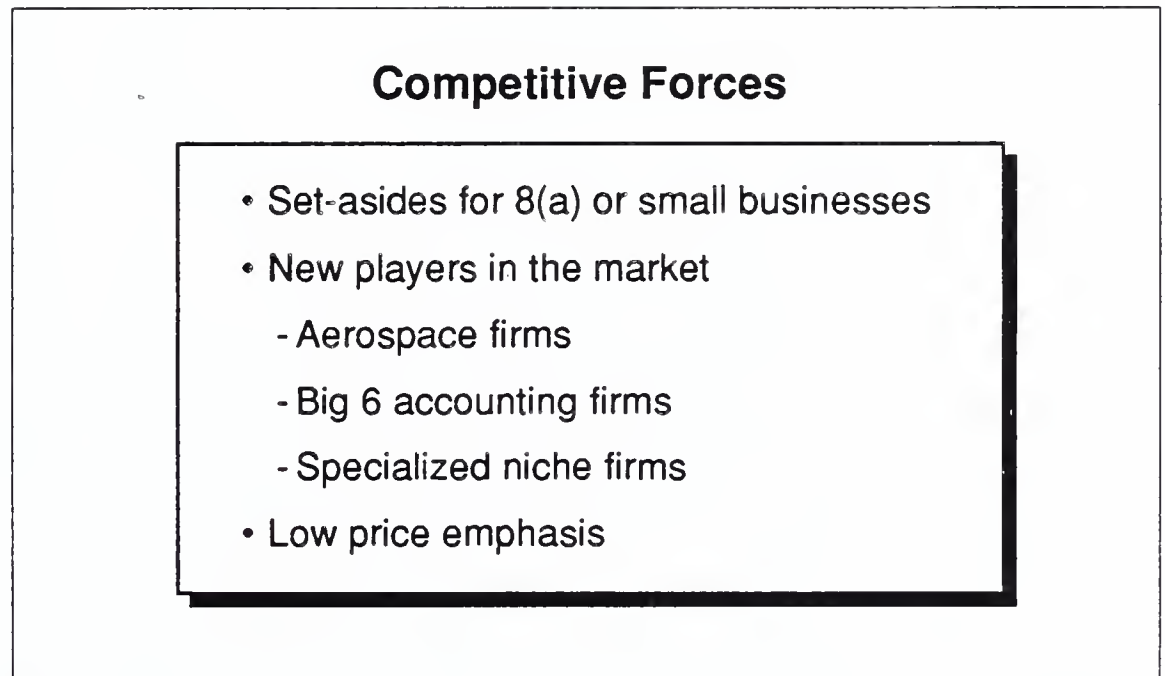
Top Five Federal Government Professional Services Vendors, 1990

Vendor	Rank
Computer Sciences Corporation	1
Grumman Data Systems	2
Unisys	3
BDM	4
PRC	5

Based on vendor-supplied information for calendar year 1990

The federal professional services market continues to grow more competitive as more firms enter the market and margins grow tighter. Exhibit II-5 lists the competitive forces driving the market. Further, the government sets aside many professional services opportunities for small businesses or 8(a) firms. Larger companies can team on many of these opportunities, but new rules on subcontracting will limit their participation.

Exhibit II-5



Many companies that traditionally did not participate in this market are now beginning to play a major role. Aerospace firms, "Big 6" accounting firms, and some specialized niche vendors continue to strengthen their Washington area offices to pursue this market despite the recession. Some specialized niches include software development relying on a particular technical discipline, training on certain product lines, or consulting on federal IRM acquisition practices. Realistically, the market emphasizes low costs as a result of shrinking federal budgets. Vendors respond by cutting profit margins and enacting uncompensated overtime practices to win contracts.

E

Agency Satisfaction

The overall level of satisfaction with contracted professional services remains fairly low. Exhibit II-6 compares agency satisfaction levels with vendors' perception of those satisfaction levels. For the most part, vendor responses corresponded to those of agency counterparts.

Exhibit II-6

Agency Satisfaction with Professional Services Vendors

Vendor Quality	Ratings*		
	Civil	(DoD)	Vendor
Delivery schedule	2.8	3.3	2.9
Cost	2.9	3.8	3.2
Project management	2.9	3.4	3.1
Development visibility	3.1	3.6	3.1

*Scale of 1 to 5, with 5 being highest

The low satisfaction levels expressed by agencies represent a fundamental vendor problem that vendors believe can be alleviated by holding down costs and adhering to delivery schedules. Agencies are dissatisfied with vendors. They believe vendors do not listen to the agencies' needs, and do not provide the solutions that agencies want. The data suggests sizable problems for many professional services firms, especially among civilian agencies.

F

Characteristics of Successful Contractors

As another measure of agency satisfaction, Exhibit II-7 compares the views of agencies and vendors on the characteristics of successful contractors. In this case, DoD and civil agencies differed sharply on the rankings of vendor characteristics. The DoD ranked price and software development experience as most important, while the civil agencies ranked staff experience as number one and price as number two. It is interesting to note that vendors ranked these three characteristics as high as did the agencies.

EXHIBIT II-7

Rankings of Characteristics of Successful Contractors

Characteristic	Ranking*		
	Civil Agencies	DoD Agencies	Vendors
Price	2	1	1
Support	4	4	7
Staff experience	1	5	2
Software development experience	3	1	3
Application/functional experience	4	3	6
Federal contract experience	6	7	4
Agency experience	7	5	4

*Ranking: 1 = Most important, 7 = Least important

G

Recommendations

Vendors need to accept the notion that though program managers may prefer incentive contracts, most contracting officers still prefer to do business on a fixed-price basis. Vendors need to find, and put into practice, methods of pricing and managing professional services contracts that allow them to minimize risk. To constrain costs and remain competitive, vendors should make maximum use of automated tools to increase their productivity. INPUT also recommends the steps listed in Exhibit II-8.

EXHIBIT II-8

Recommendations

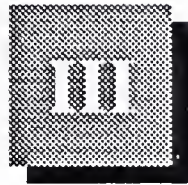
- Vertically penetrate agency customers
- Maintain positive reputation
- Survey clients for potential problems
- Stress standards and interoperability
- Promote best value bids

Vertical penetration relates to supporting agencies at a series of points in the systems process, rather than just through a single contract. For example, a successful system design may lead to substantial follow-on work in systems implementation. This kind of account control can frequently be very profitable for professional services vendors.

Maintaining a positive reputation is critical in the federal market, despite stringent procurement rules. Regardless of how evaluation criteria are written, agencies can usually find a way to avoid contract awards to an unwanted bidder. Vendors could further improve their reputations by surveying their clients and resolving issues.

Professional services vendors can improve their competitive positions by stressing standards and interoperability. Standards continue to be a hot issue in the federal market. Pressure is mounting for systems interoperability and data sharing capabilities to be extended between and throughout agencies. Systems developed in accordance with published standards will be more valuable to agency customers.

Most agencies traditionally award contracts based on the lowest price offered. Vendors can reverse this trend by encouraging agencies to employ the best value concept when performing bid evaluations. The Yockey memorandum, recently issued by the DoD, encourages the best value concept. Vendors may find that its not necessary to dramatically reduce profit margins to win contracts if agencies place more value on technical scores than on cost.



Market Analysis and Forecast

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A

Overview

Over the past few years, the federal government's use of professional services contracts has grown considerably. This growth has occurred despite continuing budget constraints in many agencies. It arises from various factors, including personnel policies, technically complex functional requirements, and growing support requirements, which are discussed later in this chapter.

The market size is lower than forecasted in previous years because INPUT has revised its service delivery modes. Systems integration and systems operations are no longer included in the professional services market.

The slower federal budget growth has led to intense competition for available contracts. Many companies, formerly on the periphery of this market and historically focused on other areas, are now pursuing this market. These factors, along with continuing client interest, have also led INPUT to update this report every year.

B

Market Forecast, FY 1991-FY 1996

The federal professional services market will grow from \$1.9 billion in FY 1991 to \$2.7 billion in FY 1996 at a compound annual growth rate of 7%, as illustrated in Exhibits III-1A and III-1B. The previous expected growth rate for this market was 8%.

EXHIBIT III-1A

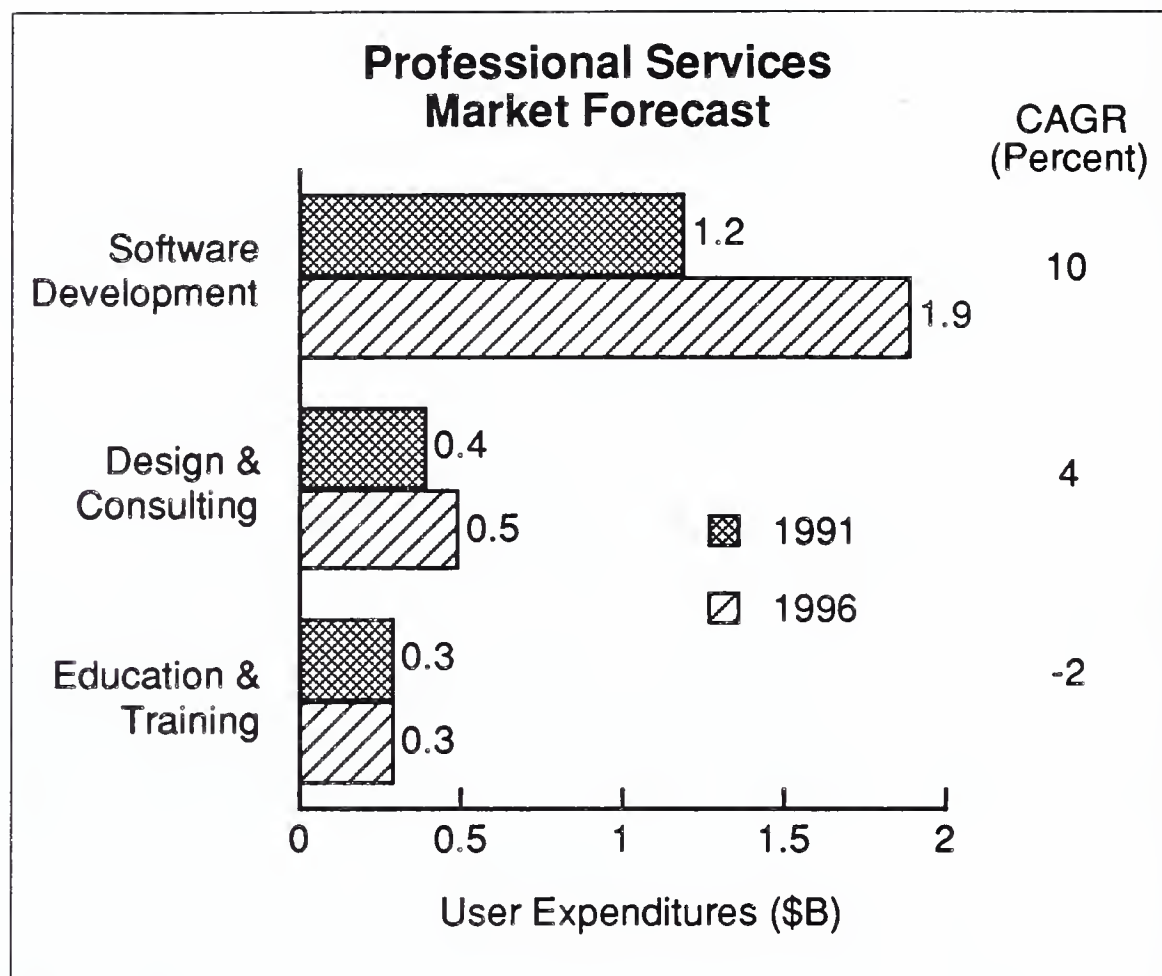
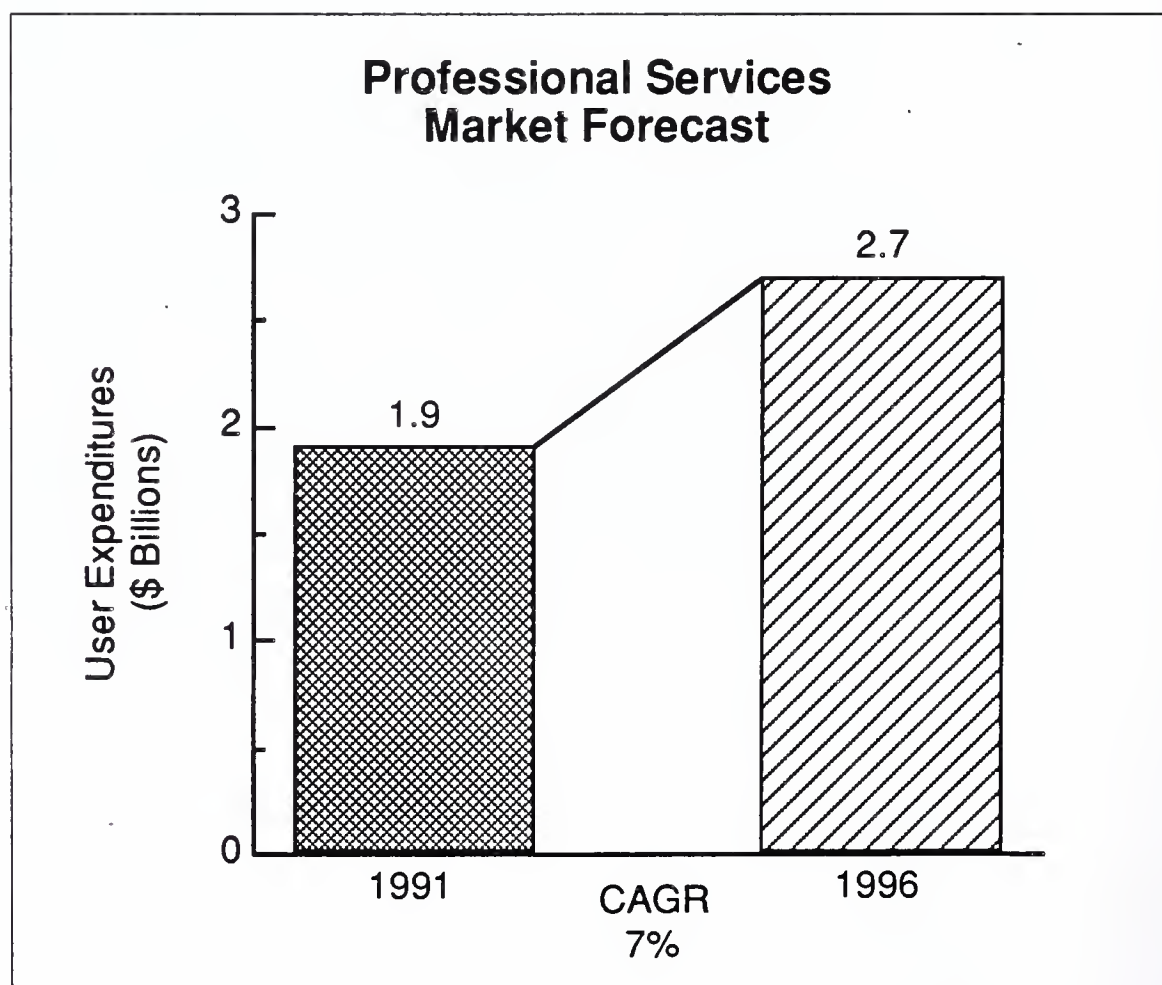


EXHIBIT III-1B



Although the CAGRs are up for software development, and design and consulting services from those predicted in 1990, anticipated user expenditures are down. Education and training expenditures are expected to remain flat during the forecast period. INPUT's estimates of this market's growth potential are based on many factors. Interoperability needs, congressional pressures and the budget deficit are impacting all subdelivery modes of professional services.

Software development continues to be the biggest piece of professional services. However, the growing use of software packages, as well as agency policies encouraging their use, is holding down the increase in this category. The other categories are also growing more slowly, due primarily to a folding of these activities into systems integration.

Professional services have a variety of task names. Professional services are defined by INPUT and discussed in the following categories (also see Appendix B):

- Education and Training
- Design and Consulting Services
- Software Development

1. Education and Training

Education and training services relate to information systems and services for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming, and software maintenance. The government normally contracts for:

- Training programs
- Books and manuals
- Seminars
- Automated training systems

The independent education and training market will remain flat at \$300 million during FY 1991-1996 at a compound rate of -2%. This decline is due to a number of factors, including:

- In times of severe budget constraints, training and travel are usually the first items to be cut.
- As more technical functions are contracted out, the number of federal personnel requiring technical training is gradually declining.
- To the extent that agencies choose training methods other than the traditional classroom approach, unit training costs decline sharply.

- Despite mandated training under the Computer Security Act, most agencies have provided little or no security training to their personnel.
- Training on new systems acquired through SI contracts is included as part of the services provided by the prime contractor, directly or through subcontracts, and is not separately acquired by the agencies.

However, expansion of existing systems to more end users, hardware and software upgrades, and new forms of technology (such as image systems) are fueling the need for additional IS training programs for users and systems support personnel.

Already agencies are forced to rely on contractor assistance to train the majority of agency personnel. Despite no market growth, current dependence on contractors to provide IS training is expected to increase, based on projections of future federal training needs. A report entitled *Civil Service 2000*, issued by OPM, cites retraining of existing IS personnel and other workers as the primary avenue for the government to meet staffing requirements in the near future. Agencies must develop programs to better utilize the work force they do have by retraining them to develop new and polish old skills. The national work force is expected to grow by only 1%, and combined with a less competitive pay scale, federal agencies will be even less able to attract qualified technical personnel.

The federal government continues to face a mounting budget deficit crisis. Noncritical expenditures, such as training and travel, will be increasingly limited. Funding problems are not expected to abate in the near future. Although agencies will feel increased pressure to provide more IS training, it will be difficult to obtain support for budget requests for these services.

This market is covered in more detail in a companion INPUT FISSP report, *Federal Education and Training Market*. The report was published in late 1990.

2. Design and Consulting Services

Design and consulting services in the federal market include information systems and/or services management consulting, program assistance (technical and/or management), feasibility analysis, and cost-effectiveness trade-off studies. Examples of government consulting services contracts are:

- Feasibility studies
- ADP requirements analysis
- System audits
- System Engineering and Technical Direction (SETD)
- System Engineering and Technical Assistance (SETA)

It also includes the initial design of systems, as well as the Independent Validation and Verification (often referred to as IV&V) of newly installed systems. System development, however, is included in the software development category.

The design and consulting services market will grow from \$400 million in FY 1991 to \$500 million in FY 1996, at a CAGR of 4%. This is a small increase from last year's predicted growth rate of 2%.

Congressional pressure is toning down the amount of design and consulting services that agencies can use. There are some members of Congress who believe that the government contracts out services that should be done by government personnel, thus creating a "shadow government." Congress may, in fact, pass bills further limiting the amount of consulting allowed in agencies in the near future.

Severe budget cuts are preventing defense agencies from contracting out their consulting. This is especially apparent in mission-oriented programs (such as weapons systems) that are stretched out.

3. Software Development

Programming and analysis services, also called software development, include systems design, contract or custom programming, code conversion, benchmarking, and software maintenance. The government usually contracts for:

- Hardware and/or software system design
- Custom software development
- Modification of off-the-shelf software products
- Software testing of custom-developed and commercial packages
- Software conversion
- Maintenance of operating and applications software

Software development will increase from \$1.2 billion in FY 1991 to \$1.9 billion in FY 1996, a CAGR of 10%. This is a slight increase from last year's forecast. This rate, however, is much lower than the software development growth of earlier years. During the mid-1980s, the software development growth rate was around 22%. Program rescheduling and reductions in ongoing contracts reflect agency efforts to retain in-house staffs. The shortfall in programming skills of the federal government sector will continue to be the most significant factor behind the projected growth in the out-years. Government staff limits and the backlog of software maintenance tasks at most government data centers also contribute to the demand for vendor assistance in this service mode.

OMB's continuing emphasis on software products, standardized software, and systems interoperability are holding down growth in this market. Further, the growing viability of programmer workbench products and other productivity tools will help to reduce the cost of new software being developed.

In previous *Federal Professional Services Market* reports, INPUT included systems integration and systems operations as components of professional services. INPUT now covers these two categories separately in volumes devoted to each service mode category.

C

Vendors of Professional Services to the Federal Government

1. Leading Professional Services Vendors

The top professional services vendors to the federal government during 1990 are listed below. The same vendors usually appear in the top ten each year. However, their rankings may fluctuate dramatically from year to year. The continually changing demands for different services and the patterns of vendor teams for different programs make a complicated competitive structure. Quite frequently, today's bidding partners are tomorrow's competitors. Employee changes make a difference in the rankings as well. A skilled and experienced leader can change the stature (and ranking) of a vendor in a relatively short time.

Some firms that normally would be expected to be leaders in this market are not listed. Boeing Computer Services, SHL Systemhouse, and TRW all chose to include much of their federal professional services revenue under the heading of systems integration. It also explains why other firms with high overall federal revenue are ranked relatively low in the list of leading professional services firms. These firms also choose to identify a large amount of their revenues in areas other than professional services.

2. Vendor Profiles

The remainder of this section is devoted to short profiles on each of the vendors listed in Exhibit III-2. The profiles examine the relative strengths of each firm, major contracts it has won, and other facts. This information will provide basic knowledge of each leading professional services company.

Exhibit III-2

Top Federal Government Professional Services Vendors, 1990

Company	Revenue (\$ Millions)
Computer Sciences Corporation	323
Grumman Data Systems	111
Unisys	108
BDM	106
PRC	105
Computer Data Systems, Inc.	102
EDS	102
Martin Marietta	96
Centel Federal Systems	92
IBM	89

Source: Company-supplied data for calendar year 1990

a. Computer Sciences Corporation (CSC)

CSC was founded in 1959 and for the 1990 fiscal year (ending on March 31, 1991) had revenues of over \$1.5 billion. CSC currently has 26,000 employees worldwide. Over the past five years CSC won 54% of the contracts that it bid on.

CSC collected \$993 million in revenue from the federal government in fiscal 1990. This is an increase of 11% from the previous fiscal year. These sales figures account for 66% of total corporate revenues, compared with 73% in 1989. This decrease reflects the rapid growth of CSC's commercial and international activities, rather than diminished federal demand for CSC services.

CSC's Systems Group is the corporate entity that primarily provides services to the federal government. The Systems Group has five operating divisions:

- The System Sciences Division headquartered in Calverton, Maryland provides support to NASA and FAA, and basic technology services.
- The Applied Technology Division in Falls Church, Virginia provides facilities management, range operations, maintenance, and information sciences services.
- The Integrated Systems Division headquartered in Moorestown, New Jersey provides total turnkey systems engineering and software systems support for major government systems.
- The Network Integration Division in Herndon, Virginia specializes in the implementation of wide-area data communications networks and remote data telemetry systems.
- The Systems Engineering Division in Falls Church, Virginia provides systems engineering and technical assistance (SETA) services to a broad client base and offers specific emphasis on communications and software support.

CSC possesses a diverse portfolio of information technology contracts across the breadth of the federal government.

CSC won a large contract from the U.S. Postal Service to help increase the efficiency of mail processing and administrative functions. CSC will provide system design and development for fully automated, self-service retail postal centers intended to be part of the "Post Office of the Future," and bar coding software to meet the Postal Service's goal of automated processing of all mail by 1995.

In 1990, CSC won several major contracts: System 90 (described below) from Treasury and TOSS from EPA. TOSS (Technical and Operating Support Services) is worth \$54 million in the base year and could be worth \$347 million if the government exercises all options. Unisys formerly held this contract. This contract significantly expands the scope of work that the company provides the agency, which includes a wide array of data processing and telecommunications services. CSC has been EPA's principal contractor for information technology services since 1977.

CSC's Applied Technology Division was awarded a \$48 million contract in August 1990 from GSA to provide system development and software support services for scientific and engineering applications in GSA's Pacific Zone.

NASA selected the Applied Technology Division for a \$65.7 million contract to provide engineering support services for the Wallops Island facility. CSC will support sounding rocket, balloon, and aeronautical programs and support launch range projects.

CSC was awarded the System 90 contract by the Financial Management Service of the Department of the Treasury. The first year of the contract is worth \$22.3 million, and there are options for nine annual renewals, totalling approximately \$90 million. CSC's Integrated Systems Division will replace and integrate hardware and software systems at the agency's seven regional financial centers and the National Computer Center.

CSC continued its capture of significant federal contracts during 1991 with the award of the following contracts:

- A \$25 million subcontract to IBM for the U.S. Courts' Nationwide Data Communications Network. CSC will install and maintain the equipment and provide training and network management functions.
- The Air Force Systems Command's Management Information Systems and Technical Support contract for \$180 million.

CSC anticipates continued growth in the federal government market. CSC has identified more than \$14 billion in contracts that match its capabilities and are slated for award over the next three years.

b. Grumman Data Systems

Grumman Data Systems (GDS) is a division of the \$4 billion Grumman Corporation. Headquartered in Bethpage, New York, with major administrative and program offices in Herndon, Virginia, GDS is a division of Grumman's Data Systems and Services Group, with annual revenues of nearly \$500 million.

The Grumman Data Systems and Services Group operates from over 100 locations throughout the United States and abroad. Its other divisions include Grumman Systems Support—the services integration arm of GDSS, offering a variety of integrated systems services to the commercial market—and Grumman Technical Services, which provides operations, maintenance, and engineering services at Kennedy Space Center, aboard aircraft carriers, at military bases, and at remote locations around the United States and the world.

As part of the Group, GDS is among the federal government's top integrators of large-scale information systems. GDS offers systems integration and professional services support of ADP and computing systems, logistics and industrial modernization systems, and command, control, and intelligence systems for the DoD, federal, state and local governments, and private industry.

In 1990, GDS won two major contracts involving professional services. In December 1989 DLA awarded GDS a \$60.7 million contract for the Defense Integrated Data System located at the Defense Logistics Services Center (DLSC).

In April 1990, the Office of Naval Research awarded GDS a contract to install a Class VII supercomputer at the Naval Oceanographic Office in Mississippi. The contract is valued at \$40.9 million. There is also an option to install another Class VII supercomputer at the Fleet Numerical Oceanographic Center in Monterey, California.

GDS has a large array of services to provide potential customers. GDS provides custom software design, systems integration and engineering, systems evaluation, feasibility studies, requirements analysis, training, operations, and maintenance.

c. Unisys

Unisys experienced another difficult economic year in 1990. In 1989, the company began restructuring due to unfavorable U.S. and European market conditions. Although some progress was made in 1990 toward higher cash flow, a positive operating income, and lower debt, company goals were not achieved. Unisys will continue to reduce its work force and sell non-strategic assets. A recent effort to reduce debt was the sale of Timeplex to Ascom Holding AG in 1991 for \$207 million in cash. Unisys hopes to sell its Defense Systems Group to further expedite debt reduction.

The new Unisys business strategy is to provide mission-critical business solutions on open information networks in high-volume transaction environments. The company will focus resources on service and on increasing revenues from its established customer base. Company marketing efforts will be targeted at proven niche markets such as airlines, banks, telephone companies and government agencies.

During 1991, the State Department awarded a professional services contract to Unisys, valued at \$10 million, to support the Office of Foreign Missions. Unisys will supply the software and services components for the Johnson Space Center's Space Shuttle Flight Readiness System as part of a team effort with IBM. This contract, awarded in October, 1991 is valued at \$18.7 million.

Unisys has moved to open systems and is becoming an expert in particular businesses and providing specialized software. Well known software products include: LINC, MAPPER, ALLY (all CASE/4GLs), and the InfoImage products (IIPS/ICPS, InfoImage Folder, and InfoImage EDMS).

d. BDM

BDM International, Inc. operates as an independent and autonomous company, partially employee owned, in partnership with The Carlyle Group, L.P., a private merchant banking and investment firm. Carlyle was instrumental in helping acquire BDM when it was offered for sale by The Ford Motor Company as an element of Ford Aerospace Corporation. BDM was a Ford subsidiary from 1988 to 1990. President and CEO Earle C. Williams has headed the company since 1972; Carlyle Vice Chairman Frank C. Carlucci (former Secretary of Defense) serves as Chairman of BDM's Board of Directors.

BDM is a diversified professional and technical services firm, with 80% of its annual revenues of more than \$300 million derived from contracts with the federal government. The majority of these contracts are with Department of Defense agencies. BDM also performs significant contract programs for the Department of Energy (approximately \$65 million), the Securities and Exchange Commission (more than \$60 million), and NASA (approximately \$90 million) and other non-defense agencies and departments. Major initiatives are also under way in state government management information systems and civil transportation programs at the federal/regional level.

BDM's major business areas include: national planning and policy research; advanced technology and concepts; advanced systems and programs; systems development, engineering, and integration; information and data systems; C3I and communications systems; advanced manufacturing systems; logistics systems and support; test and evaluation; test instrumentation; education and training systems; energy and environmental systems and programs; security systems; and space programs.

e. PRC

PRC provides technology-based systems and services to government and commercial clients worldwide. It is a subsidiary of the Black & Decker Corporation, a \$4.8 billion multinational corporation.

PRC was formed on January 1, 1991, by the merger of the former Planning Research Corporation (founded in 1954) and Advanced Technology, Inc. (founded in 1976).

PRC's 1990 revenue was \$658 million and it has approximately 6,500 employees. PRC differentiates itself from its competitors by combining a great depth of understanding of key technologies with an equal depth of understanding in specific markets and industries. It delivers complete information systems, products and services solutions, specializing in technologies such as document management, networking and open systems integration.

Organizationally, PRC has three operating groups and one subsidiary. The Applied Management Group provides systems integration, information services, engineering and logistics to federal government agencies and departments, both defense and civil. The Engineering Technology Group provides the federal government, primarily DoD, with systems and services including C3I, combat, intelligence, and space systems. The Commercial Systems Group provides systems integration and professional services to the real estate industry, state and local governments, utilities, international clients and manufacturing industries. PRC Environmental Management, Inc., provides environmental engineering consulting, including all aspects of environmental management and hazardous waste clean up, to the EPA and other government agencies.

PRC applies a full range of systems analysis and multidisciplinary skills to large-scale, image-based document management systems; turnkey information processing; telecommunications, network and distributed data base management; on-line management information; command, control, communications and intelligence data handling; real-time process control and data acquisition; tactical data; electronic warfare; regulatory information; logistics; Ada programming; and artificial intelligence.

Some of PRC's major federal contracts include two within the Department of Commerce. The first is the U.S. Patent and Trademark Automation project, which is a multiyear systems integration contract. The second is the Advanced Weather Interactive Processing System for the 1990s (AWIPS-90). PRC and CSC are both in the definition phase of the project. Only one of the companies will be allowed to continue on the development and implementation portion of the project.

PRC has developed and is installing the DoD's Engineering Data Management Information and Control System (EDMICS). EDMICS is an imaging based system that is the cornerstone of DoD's initiative to standardize information storage and retrieval.

f. Computer Data Systems, Inc. (CDSI)

CDSI was founded in 1968 and currently has 2,700 employees. CDSI's revenues for the fiscal year ending June 30, 1991, were \$129.7 million. Revenues for the first quarter of fiscal 1992 were \$34.5 million, up nearly 11% from the same period a year ago.

CDSI provides professional and processing services, systems integration, proprietary financial software products, CASE tools, and turnkey systems. Nearly 85% of CDSI's revenue comes from the federal government. CDSI's operations are conducted through three major groups.

The Professional Services Group provides life cycle capabilities in systems development, telecommunications, financial systems, office automation, and facilities management services. This group includes three divisions: the Government Services Division, the Information Systems Division, and the Energy Systems Division. The Professional Services Group has contracts with Energy, Labor, Justice, HUD, GSA, GAO and other federal agencies.

The Systems Engineering Group supplies the DoD, the intelligence community, the GSA, and commercial enterprises with software development, systems integration, and systems operations services. This group includes three divisions: The Defense/Aerospace Systems division, the Technical Services Division, and the Systems Integration Division.

The Enterprise Systems Group (formerly the Processing Services Group) provides financial software products, CASE tools, turnkey systems, clearinghouse operations, systems integration, and full-service processing to federal, state, and local governments and commercial clients. There are two divisions within this group: the Information Products Division and the Processing Services Division. The Enterprise Systems Group's customers include HUD, DoD, FEMA, and various associations. During the past year, Enterprise Systems has had considerable success with its financial systems and services offerings centered around CDSI's proprietary Financial Accounting and Reporting System (FARS), Debt Management and Collection System (DMCS) and DMCS/SL (Student Loans).

During fiscal 1991, CDSI was awarded contracts with new customers that include the Department of the Interior, the FCC, and the U.S. Postal Service. In the first quarter of fiscal 1992, CDSI was awarded a \$23 million contract with the Navy Military Personnel Command for support of its field pay and personnel system, and contracts with the Federal Energy Regulatory Commission (FERC) with a potential worth of \$37 million over five years, the U.S. Peace Corps for a new financial system, and HUD for software development support.

g. Electronic Data Systems (EDS)

EDS is approaching its 30th year of operations in 1992. EDS had revenue of \$6.1 billion in 1990, up from \$5.5 billion in 1989, with income in 1990 of \$496.9 million, a 14% increase over 1989. Business analysts say the company will approach \$7 billion in revenue for 1991. The Federal Government Group (FGG) produced 10% of the company's revenue in 1990. The FGG, headed by Group Executive Robert McCashin, has maintained its base of business in the Washington, D.C. area since 1978. FGG includes strategic business units (SBU) from both the civilian and military sides of the federal government. EDS also has an SBU focused on state and local governments (State Operations Division—SOD). EDS currently has over 64,000 employees worldwide.

EDS has been successful in its efforts to expand its business. One component of commercial growth has been the continued signing of strategic marketing and general services agreements. In FY 1991 EDS joined with Apple Computer Inc. in selling personal computers to education for K-12 grades. The company also signed a five-year contract with AT&T to address AT&T's information technology requirements.

Another component of EDS' growth has been acquisition. In 1990 EDS acquired a 30% share of Infocel. This year EDS agreed to acquire the remaining 70% and operate it as a wholly owned subsidiary. EDS also acquired Operator Assistance Network (OAN) in FY 1991. OAN is one of the telecommunications industry's largest providers of billing and collection services and exceeds a 25% market share of the local exchange carrier billing industry. Also acquired in 1991 were SD-Scicon and the McDonnell Douglas Systems Integration Company.

EDS continues to be recognized as one of the major systems integrators in the federal government, as evidenced by several of the contracts won by FGG in 1991.

The EDS Government Services Division (GSD) SBU contracted with NASA in 1991 for a fiber optic communications network for the new NASA headquarters building in Washington, D.C. In February, EDS signed a contract with the Air Force Logistics Command to provide strategic information management planning services and training. EDS also won the Navy's PC LAN contract, which was recently expanded to include the entire DoD, GSA, and the FBI. In June 1991, the Military Systems Division was awarded a contract by the Defense Information Systems Agency (DISA) to provide technical, managerial and operational expertise for an integrated, DoD-wide information management system.

h. Martin Marietta

Martin Marietta Corporation designs, manufactures, integrates and operates systems and products in leading-edge technologies, including aerospace, electronic, information management, materials and energy. In 1990, the corporation had sales of \$6.1 billion and net earnings of \$327.6 million.

Early in 1991, in an organizational move to reduce overhead and thereby strengthen the corporation's competitive position in defense and civil information markets, the Information Systems Group's programs were transferred to other synergistic elements of the corporation. As part of this restructuring the electronics and missiles segment was expanded into a new Electronics, Information & Missiles (EI&M) Group. The Air Traffic Systems business received added emphasis as a separate element and now reports directly to the corporate executive office.

Martin Marietta Information Systems, now an operating unit within EI&M, provides products and services in the broad field of computer-based information management for federal and commercial clients. Applications include integration and servicing of information management systems, advanced simulation capabilities, computer-integrated repair and manufacturing and other logistics technologies, data processing, and the design and manufacture of automated equipment for high-speed mail sorting.

In 1990, Information Systems received a major contract to modernize the information systems capabilities of HUD; made significant inroads in assisting the U.S. Postal Service in its modernization efforts; was awarded a contract by the Air Force to modernize an equipment inventory system to track some \$25 billion in material; and continued its high level of performance on the nation's strategic National Test Bed program at Falcon Air Force Base, Colorado.

i. Centel Federal Systems

Centel Federal Systems, Inc. is a full-service ADP and communications systems integrator. With core business segments in computer and communications systems integration, telecommunications services, information security and automated forms integration, the company provides information systems and network solutions for the government and commercial sectors.

Over the past 20 years, Centel Federal has implemented numerous large, complex federal government systems employing a wide range of advanced computer and telecommunications technologies.

Centel Federal's revenues for 1990 were \$110 million. The company employs 300 people and is owned by its management, Centel Corporation, and Moore Business Forms, a U.S. subsidiary of the Moore Corporation, Ltd. of Canada.

Centel Federal offers a total range of products and services to support large, complex computer and telecommunications programs. The company has extensive experience with all facets of program requirements, including: design, engineering/development, procurement, testing, integration, program management, installation, implementation, operations, maintenance, training and customer support of complex systems.

The company offers special technical expertise in the areas of systems integration, communications networks (including FTS 2000), forms automation, secure systems, data base management, operating systems, optical digital imaging, electronic records management, workstations, multi-user systems, fault-tolerant systems, custom applications software and computer-based training.

Examples of Centel Federal's contracts include: the GSA SETA contract for FTS 2000, awarded in 1988; various services for the U.S. Postal Service; and a nationwide computer-based office automation program for the IRS.

j. IBM

Most of IBM's revenue from the federal government comes from systems integration projects, which is no longer included in INPUT's definition of professional services. IBM had approximately \$1 billion in systems integration revenue in 1990. Although IBM does not disclose its federal professional services revenue, INPUT estimates IBM received \$89 million from this market in 1990.

Professional and consulting services traditionally has not been a strong area of expertise for IBM. The company is better known for its hardware and systems software products. Since the late 1980s, IBM has been building its design, integration and custom software services. Technical training on IBM products continues to be one of the company's strengths.

3. Other Professional Services Vendors

This market is dominated by professional services and computer hardware firms. These vendors make available a broad range of skills to meet planning, development, integration, and implementation requirements.

Professional services vendors offer services that can include the acquisition, assembly, and integration of hardware, communications, and software. The fact that some of the better-known hardware vendors are leaders in the federal professional services market is a result of their increasing thrust into alternative areas of the information systems and services marketplace. Smart vendors have been broadening their revenue streams in the face of a tightening market. Also included in this market are firms that have been spun off from parent organizations not in the information services market (e.g., Boeing Computer Services, Martin Marietta, and Grumman Data Systems).

Although they have not been included in the top ten vendor list, the Big Six accounting firms are a force in the market. These companies include Andersen Consulting, KPMG Peat Marwick, Coopers & Lybrand, Deloitte & Touche, Price Waterhouse, and Ernst & Young.

Not-for-profit organizations also compete with private industry for professional services work from the federal government. Leaders in this area include corporations such as Mitre, Battelle Memorial Institute, the University of California, and Carnegie-Mellon. Aerospace Corporation provides professional services primarily to the Air Force.

Logicon has reported \$221 million in federal professional services sales. In INPUT's view, however, much of Logicon's services in this category do not correspond with INPUT's classification of professional services contracts. Development of weapons systems and simulation training services are not included in INPUT's definition of the information services market structure.

Finally, some government data centers with unique skills and/or available capacity also compete with private industry for government contracts. Government agencies have the choice of contracting outside or using available government centers, including capabilities of other agencies. In many cases the cost may be the same, but by staying in-house, the agency saves the time and effort required to put a contract into place competitively.

D

Market Size by Agency

The information presented in Exhibit III-3 provides FY 1991 and FY 1992 budget data extracted from the Office of Management and Budget Circular A-11 agency reports. Exhibit III-3 does not cover the entire federal government, but does include many of the agencies that INPUT surveyed.

The GSA continues to lead in the amounts spent for consulting, education, and training. This results from the growing popularity of the zonal Basic Ordering Agreements (BOAs), and the BOAs from FEDSIM, and the Software Management Center. The Department of Energy has greatly increased its budget in this area. This is most likely due to its heavy use of systems engineering and technical assistance contractors.

In software development, NASA is now the largest user of outside services. This reflects NASA's challenging agenda of manned space flights, probe launchings, and maintaining the space station program. GSA is also a heavy spender of outside software development money, because of the BOA contracts under which agencies can acquire the GSA-sponsored contractor services. The Defense agencies and Energy continue to use an abundance of software development services.

Unlike in past years, civil agencies are now showing more potential for growth than defense agencies. This potential reflects the effect of budget constraints on defense agencies as well as the maturation and, in some cases, winding down of major defense programs. However, since civil programs tend to be less formalized and homogeneous than defense agencies, successful vendors will need to invest more in both marketing and sales efforts.

EXHIBIT III-3

**Federal Government Agency
Professional Services Budgets, FY 1991-FY 1992**

Agency	\$Millions			
	Design, Consulting, Education and Training		Software Development	
	1991E	1992F	1991E	1992F
Agriculture	21	24	56	64
Commerce	7	7	71	122
Education	3	3	12	17
Energy	84	88	306	309
GSA	35	34	224	242
HHS	25	24	66	80
HUD	3	7	45	25
Interior	4	4	31	41
Justice	35	32	24	23
NASA	57	62	510	578
State	3	3	34	34
Transportation	8	2	65	14
Treasury	9	14	78	102
VA	17	16	17	25
Air Force	24	20	256	254
Navy	51	51	48	45
Army	46	50	153	121

E = estimated

F = forecast

E**Federal Market Issues**

Information technology promises to provide higher quality government services at a reduced cost to the public. However, the use of this technology is dependent upon the leadership of information resources management officials. These leaders need to define and implement a clear but flexible architecture that includes the agency's concept of how it will do business in the future. To bring discipline to activities of the agencies, the Office of Management and Budget requires them to produce long-range Information Resources Management plans. These plans describe the agency's current computing environment and programs and goals for the expanded use of information technology to satisfy the agency's future missions. The plan also describes how the agency will achieve those goals.

Other market issues that impact the professional services market are discussed below.

1. The Grand Design Approach

An issue that federal information technology managers face is their approach to upgrading their systems. What types of services will be procured from vendors? In the recent past, agencies often purchased equipment and services without a clear plan for how they would fit into the agency's overall strategy. This resulted in acquisitions of inappropriate or duplicate systems, and systems that could not be integrated with other agency systems.

Some agencies responded to this by acquiring a large integrated system of hardware and software. An integrated system eliminates problems of connectivity and in most cases addresses all of an agency's information technology needs. But a grand design approach to developing a computer system fosters several problems. During the planning phase of the procurement, coordination problems often arise, and the project may take so long to plan and procure that it can be burdened by staffing problems throughout its life.

The procurement can also be confounded by inexperienced project managers and contracting officials whose lack of acquisition skills could delay the project. A grand design project can also be sidetracked by uncertain funding during the planning phase. The project could be so large and take so long to implement that funding could be threatened by political opponents.

Agencies continue to face increased pressure from Congress, GSA and GAO not to use the grand design approach to solve integration and modernization problems. Many of the criticisms of the grand design approach can also be applied to the modular approach. However, the real differences between the two approaches appears to be the contract vehicle, and the levels of funding required.

Opponents of grand designs forget that in the end a modular project must be tied together into an integrated system. In the past, having one vendor responsible for integration has proven successful. As agencies begin to adhere to GOSIP-compliant products, many of the problems associated with integrated disparate systems will be eliminated. Systems connectivity and interoperability can be implemented without resorting to costly code conversion.

2. The Competition In Contracting Act (CICA)

The Competition in Contracting Act (CICA) of 1985 provided expanded legal powers for ADP protest action through the GSA Board of Contract Appeals (GSBCA) and GAO, increased the opportunity to employ negotiated contracts, and established seven more-restrictive categories of exceptions that permit sole-source awards.

The CICA has not achieved what was expected, as is well known in the vendor community. Today, virtually all major procurements are protested. Some agencies and winning vendors are providing payments to protesters in order to secure withdrawal of the protest. This is known as "greenmail." Protest actions occur in procurements of all types, including professional services.

Based on analyses of protest decisions, it is apparent that evaluation procedures represent the biggest source of protest actions. If agencies lock themselves into an overly restrictive evaluation model, any deviation usually results in a sustained protest. GSA has recommended more flexible evaluation models, giving the selection committee more latitude in comparing the cost and technical bid specifications. This complicates the bidding on professional services contracts, since the trade-offs between price and offerings are not always clear.

The General Accounting Office offers information resources management officials insurance for delicate ADP acquisitions by setting up a "straw man" acquisition model that agencies can use to compare with their ongoing procurements. Agencies have often complained that they have followed what they perceived to be the rules of procurement and still found themselves the subject of GAO audit reports. The GAO model is divided into several phases: presolicitation, solicitation, award, and postaward.

3. Budget Constraints

Future-year funding of current acquisition programs and approval of funding for the next budget year are now routinely cut. Defense spending for FY 1992 has just been cut by 25%-30%. The authorization of an agency budget and the requested information sources by the agency oversight committee do not assure agencies or vendors that funds will be provided in the out-years. Appropriation acts for agencies approve the TOA (Total Obligational Authority) for certain large systems, but not the fiscal year or years in which the funds (called outlays) will be available.

The effect of the budget crisis on professional services programs will be to reduce the amount of overall funding available for them and to slow the amount of spending on outside services. The government will move to protect itself, like a turtle withdrawing into its shell. The government will continue to contract for those services it has in the past, but new projects and initiatives will often be cancelled or postponed.

4. POSIX

Portability of software, which protects past investment in application development independent of the hardware platform it may run on, is in high demand. Agency respondents in previous studies noted a growing need for portable software that is readily adaptable to a changing hardware environment. Professional services firms should accommodate this condition by providing the procedures and techniques to foster software integration.

Some agencies believe that UNIX-based products provide a partial solution to the problem of interoperability of software across different vendors' hardware. However, among vendors, differences still persist on various implementations of the POSIX standard, and these differences will retard the interoperability requirements of agency executives.

Most agencies now emphasize the need for information sharing. POSIX facilitates trading of information within an agency by allowing applications developed in different facilities to be used throughout the agency. Agencies are increasingly required to merge large applications into a single, transparent software system that fits their end users' needs.

The DoD intends to standardize common business functions among the military services. The CIM initiative will implement new DoD data and functional standards. The same applications software supporting common business functions will be used DoD-wide. By establishing standard ADP software, CIM will keep DoD budget cuts from negatively impacting the delivery of information processing services.

To modernize software and effect productivity improvement, agency ADP organizations are seeking greater use of:

- Software engineering technologies (CASE tools), including more efficient software management methods, software development methodologies, and data dictionaries
- Higher-level development tools, including program generators and fourth-generation languages
- Better analytical tools for all sizes of machines—microcomputers, midsized computers, and mainframes—that will provide programmers with development aids such as automatic documentation, cross-referencing, etc. Agencies also require improved system software for supercomputers, and this represents a growing market.

5. GOSIP

Most federal agencies are beginning to implement systems under GOSIP—the Government Open Systems Interconnect Profile. GOSIP is a subset of the International Open Systems Interconnect Communication standards. GOSIP will support interoperability and data exchange among different federal computer systems and communications networks. As of 1990, GOSIP became a requirement for new systems and services. Agencies will use GOSIP to integrate their multivendor networks and systems. Most RFPs now specify GOSIP-compliant products.

With the DoD, vendors face a potential dilemma. On one hand, DoD has specified GOSIP as a mandatory standard in 1990. The Defense Information Systems Agency (DISA) is now a GOSIP test center. However, several DoD agencies are showing reluctance to abandon the Transmission Control Protocol/Internet Protocol (TCP/IP) standard.

Therefore, over the next few years DoD will continue to procure systems with both GOSIP and TCP/IP. TCP/IP-based systems will, however, decrease in frequency and will gradually be replaced by GOSIP-based systems. Vendors, therefore, must show a willingness to adapt to changing government requirements. A requirement for dual standards was evident in a recent Air Force contract to provide network interfaces that support both GOSIP and TCP/IP standards. The Air Force, unable to determine which standard to follow, decided that only a dual-standard approach would provide suitable connectivity.

6. Computer Security

Computer security for the federal government focuses on protecting the integrity of federal information systems. The concept of integrity in government information entails the confidentiality of data to which access should be limited, such as personal, proprietary, and national security classified data. It also includes assuring the accuracy and accessibility of information so that the public can be informed and agencies can discharge their duties efficiently and responsively.

The federal government could spend ample sums on professional services support to help meet its computer security needs. First, the Computer Security Act requires training of appropriate personnel. Although the Office of Personnel Management (OPM) has become very active in this area, various private groups are also providing computer security training to federal personnel. Secondly, continuing consulting support will be needed for security evaluations and audits, as well as for upgrading computer security measures. Custom software development will also play an important role in the computer security market. However, if the agencies are not required to submit updated security plans, the volume of planning opportunities will likely disappear. This market is examined in depth in another Federal Information Systems Program report, *The Federal Computer Security Market, 1990-1995*.

7. Ada

The federal Ada market is now becoming a major force, despite its slow start. The Ada-related software development market is growing slightly faster than the overall federal software development market. INPUT has forecasted the Ada software development market to grow from \$66 million in 1989 to \$104 million in 1994, a CAGR of 10%. This strong growth is because most Ada projects require new, custom solutions.

The House Appropriations Committee recently approved a 1991 DoD budget package that would require all software to be written in Ada. The bill proposes that after June 1991, all new software be in Ada unless the defense secretary issues a waiver. The bill added \$10 million in Ada research and development.

It has been reported that most Ada software engineers and program managers believed that Ada increased their productivity. However, in a recent report, GAO complained that DoD had not designed projects to assess the long-term cost savings and other benefits of Ada. This may account, in part, for Ada's slow progress because budget constraints may inhibit program managers from experimenting with Ada.

In some respects, many Ada products are now tied in with CASE products. Many vendors now offer product packages that include modules from both disciplines. Thus, vendors can offer more comprehensive solutions to agency problems. However, some agencies have been slow to take advantage of these packages because of cuts in training budgets.

It has been proposed that Ada should be made POSIX-compliant in order to put the language in the mainstream and ensure its survival. Current versions of Ada do not communicate effectively with the rest of the programming world, and it lacks a standard execution environment. POSIX could provide this environment.

8. Artificial Intelligence

Vendors continue to promote artificial intelligence technology to the government, primarily in the areas of software development and decision support. Currently, expert systems (which are a popular subset of the family of AI capabilities) are being developed as standalone end-user production systems to automate knowledge-based processing. In meeting federal professional services needs, vendors must often include AI features as part of their offerings. Uses of AI in federal agencies include:

- Expert systems for software development and decision support
- Training
- Prototype systems
- Information systems management

The DoD has taken the lead in developing artificial intelligence programs. AI is providing useful training for analysts, and applications are being employed in tactical situations, weapons platforms and support functions. Civil agencies are also developing and operating expert systems for large-scale information processing.

As in other software areas, the government is looking to industry for solutions, not just products. Therefore, in response to this trend, AI vendors will migrate beyond standalone systems to new products that integrate approaches and solutions. Current federal prototyping efforts are demonstrating AI feasibility in information storage and retrieval, data communication, and other typical management functions. Areas in which federal workers must interview the public seem especially promising for AI.

9. Procurement Integrity Act

Another law with negative effects on federal procurements is the Procurement Integrity Act. The Act—which originally went into effect on July 16, 1989—was written to ensure that no bias has infringed on the procurement process. It required procurement officials to certify that they have complied with the law and that all members of their contracting team also complied with its provisions. The law carried penalties for government contracting officials and vendors, including fines and imprisonment.

However, in December 1989, President Bush signed the Ethics in Government Act, popularly referred to as the Congressional Pay Raise. This law suspended the Procurement Integrity Act for one year. Lobbying efforts by the Bush Administration caused an additional postponement of the Procurement Integrity Act until June 1991.

The Procurement Integrity Act has caused discontent and confusion among industry and federal agencies. Industry representatives claim that they are aware of the general intent of the law, but are uncertain what full obedience will involve. Agency officials complain that the law is unclear and that it adds cumbersome paperwork to an already burdensome process. Any additional steps or procedures to the federal procurement process tend to further delay the actual process of winning contracts, and thereby influence contractors' revenues.

10. TRAIL BOSS

The TRAIL BOSS program initiated by GSA is touted as successful. Many federal managers have received their training and are now leading federal information systems acquisition projects. The GSA is now putting into place a second and a third TRAIL BOSS program. One would train 1,000 managers by the year 2000. The third TRAIL BOSS program will prepare senior IRM managers for all facets of installing and maintaining major systems.

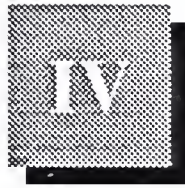
11. MASCS

Since the 1990 version of this report, much of the confusion concerning GSA policies for Multiple Award Schedule Contracts (MASCS) has been resolved. The Maximum Order Limit (MOL) has been stabilized at \$300,000. The DPA threshold has increased to \$2,500,000 for competitive actions, and is set at \$250,000 for sole-source procurements. Based on how the requirements are stated, the contracting officer will determine if the action will be sole source or a competitive procurement. New DPA thresholds should have more impact on hardware procurements than on professional services procurements.

A GSA report entitled "Final Report of Government-Wide Task Group on Multiple Award Schedule Contracts," dated August 1988, recommended an increase in the synopsis threshold from \$50,000 to \$250,000. However, at the writing of this report, GSA does not expect this to happen.

12. Mergers and Acquisitions

The merger and acquisition trends in the federal marketplace seem to be subsiding. Because the federal professional services market is growing at a slower pace, professional services firms lose their attractiveness and lose their value. Black and Decker could not find a buyer for PRC and Advanced Technology, Inc., so the two firms were merged. The new firm, called PRC Inc., is headed by Gary D. Kennedy, formerly with Oracle. BDM was recently acquired by the Carlyle Group and may have found a permanent home. Frank Carlucci is a top officer in the Carlyle Group, and he has indicated interest in keeping BDM.



Federal User Requirements and Trends

A

Overview

Opportunities in the federal professional services market appear in a number of agencies. Most contract opportunities require custom software and education and training services from contractors. Exhibit IV-1 presents the distribution of professional services initiatives identified by agency and type of effort.

Expansion programs only represent 13% of the market. Seventy-five percent of these expansions or systems upgrades are identified as requirements originating with civil agencies.

Replacement programs constitute half of the market from FY 1992 to FY 1996. Most opportunities in this category are recompetes of existing technical services contracts.

B

Significant Problems/Issues

Federal information systems (IS) modernization directives, in combination with automation demands and technology advances, are contributing heavily to the federal government's continuous need to improve the quality and quantity of ADP services. The use of image systems and geographic information systems are becoming widespread in the federal sector. This is occurring within the confines of budget deficit reduction measures. At the same time, modernization directives are overcoming the handicap of a rapidly aging ADP inventory and escalating software costs. More requirements contracts and greater use of functional specifications are facilitating this transition to new and better systems.

EXHIBIT IV-1

Professional Services Opportunities by Agency FY 1991-FY 1996

Agency	Upgrade/ Expansion	Replace- ment	New Starts	Total
Defense				
Air Force	2	6	7	15
Army	2	3	4	9
Navy	0	3	5	8
Marine Corps	0	2	0	2
Defense Dept.	0	4	4	8
Subtotal	4	18	20	41
Civil				
Agriculture	3	0	0	3
Commerce	0	3	3	6
Education	0	6	1	7
Energy	1	4	1	6
EPA	0	1	1	2
EOP	0	0	1	1
FCC	0	0	1	1
FEMA	1	0	0	1
GSA	0	2	1	3
HHS	1	2	0	3
Justice	1	6	2	9
Labor	0	1	0	1
NASA	0	9	4	13
State	1	2	0	3
Transportation	2	5	3	10
Treasury	2	1	4	7
VA	0	0	1	1
Subtotal	12	42	23	77
Total	16	60	43	119

Source: INPUT Procurement Analysis Reports

1. Budget and Personnel Constraints

Most federal agencies do not have the necessary staff to support the quality or quantity of IS-supported services demanded by the Congress and by the American public. Agency respondents noted that the current federal personnel policies have kept government agencies from hiring and retaining enough qualified IS staff. Hiring ceilings and low salaries were cited as the main reasons leading to the increased attrition rate in the government and the growing use of contractors for professional services. In most metropolitan areas the problem becomes even more acute.

The federal government has been unable to compete with the private sector in recruiting because the financial rewards offered by the private sector are better. Furthermore, government personnel policies contain outdated standards and job descriptions and impose severe administrative problems. If the current recession continues, the impact on the private sector could result in increasing attractiveness of government employment.

Some resolutions to these problems are being developed. Currently, agencies are working with the Office of Personnel Management to upgrade procurement professionals and give greater support for contracting personnel. The Trail Boss program has also been initiated; this program is improving the training of contract administrators and senior project managers.

In keeping with administration policies relating to OMB Circular A-76, most commercial-type (as defined by OMB) activities are subject to being contracted out. This includes most activities supporting information systems, with the exceptions of planning, budgeting, and overall program responsibility.

For the past several years, budget cuts have somewhat limited the growth of the professional services market. However, as indicated in the previous chapter, the federal professional services market will continue to grow, which is further shifting the balance between in-house and contracted professional services activities.

2. IS Equipment Inventory Upgrade

Upgrading the existing inventory of IS equipment will initially result in reduced software maintenance costs. However, this upgrade will not significantly impact overall software expenditures for several years.

The GAO estimates that 70% of life cycle software costs are related to maintenance. As more custom software and complex systems are developed by or for the government, more maintenance labor will be required to keep that software functional, including interim upgrades to expand the applications of host computers. This may lead to growth in on-site sup-

port services among professional services firms. On the other hand, increased use of commercial-off-the-shelf software will reduce the need for custom software and its associated maintenance. INPUT includes software maintenance in the software development category of professional services.

3. Personal Computers

The rapidly escalating acquisition of personal computers by government personnel highlights major problems of accessibility to the government's numerous data bases and creates opportunities for professional services contractors.

- Re-encoding data designed for large systems can require substantial effort, cause delays in data availability, or lead to inaccurate conclusions.
- Implementation of new technology with more-efficient software imposes an additional technical problem—how to recover information from the tapes of earlier systems, especially when the file codes and procedures are inadequately documented. Numerous professional services firms, often acting through requirements contracts at GSA's Office of Technology Assistance (OTA), have successfully assisted agencies in this effort.
- An increasing number of federal end users require training on hardware and PC-based systems, thus increasing education and training opportunities.
- Security risks escalate with proliferation of sensitive data in PCs that are not adequately protected during user absence. The DoD is very concerned about the impact of these risks. It is likely that more consulting support will be required to help find ways to protect this data.

4. Embedded Computers

Embedded computers are digital computers that are applied in, among other things, real-time military equipment operations to solve tactical, strategic, and operational problems. An embedded computer is capable of accepting information about and providing the results of these problems. As embedded computers become more popular in federal applications, professional services opportunities to support them will become more common.

Although INPUT did not include services provided by professional services contractors to support the embedded computer market in its forecast, there are many opportunities for vendors serving these systems. Contract services are required for consulting, training and education, and software development.

5. Software and Related Services

OMB continues to pressure agencies to contain costs by maintaining existing software and, when that is not possible, to acquire software packages rather than create new custom software. For example, OMB mandated that financial software packages be acquired, rather than developed, that conform to an interagency standard. In past years, civil agencies have had a greater propensity to purchase packaged software. But last year, the Air Force was the largest buyer, spending \$57 million in 1990, followed by the Navy with \$29.4 million. The largest expenditure by a civil agency was NASA's \$10.8 million.

Among defense agencies, the Air Force, Navy, and Army all have substantial systems analysis, development and programming budgets. However, growth in expenditures over the last several years was slow and will remain so for the forecast period. Slow growth notwithstanding, these agencies represent significant opportunities for custom software development, having spent over \$317 million in government fiscal year 1990 alone. NASA was the largest civil agency buyer of custom services in 1990, spending \$109.8 million.

C

Budget and Applications

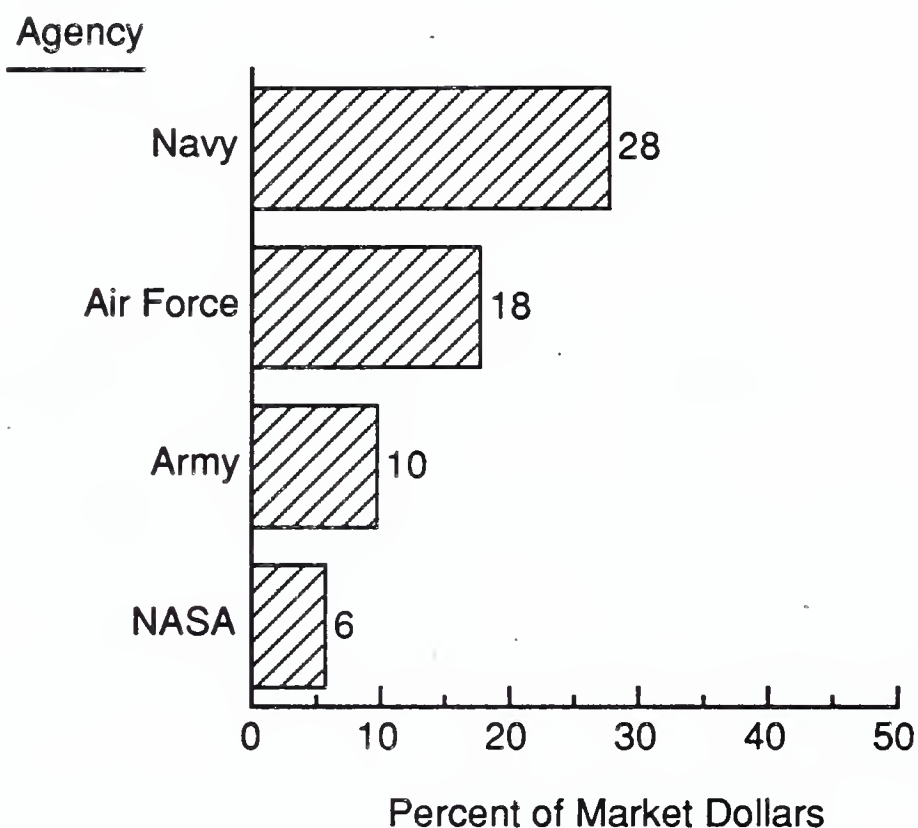
In earlier surveys, most agency respondents indicated that requirements for professional services would increase. Agencies emphasized the need for new and expanded data services that exceeded current staff capacity and capabilities. Further, as pointed out earlier, OMB Circular A-76 was having a strong impact, especially in DoD maintenance expenditures.

Although use of systems analysis services will increase, there is considerable pressure to contain expenditure growth.

The largest agency users of professional services by service categories are shown in Exhibits IV-2 through IV-4. GSA Federal Procurement Data Center data for GFY 1990 was analyzed to determine the percent of market dollars spent by each agency in each service category. Data was reported in three categories in the Federal Procurement Data System. These classifications are similar to INPUT's professional services delivery/service mode.

Of the market dollars spent by all federal agencies for systems development assistance, the Navy purchased the most (29%). This primarily reflects the Navy's modernization of logistics and supply systems.

EXHIBIT IV-2

**Federal Government Professional Services
Top Four Agency Users, GFY 1990
Service Category: Systems Development**

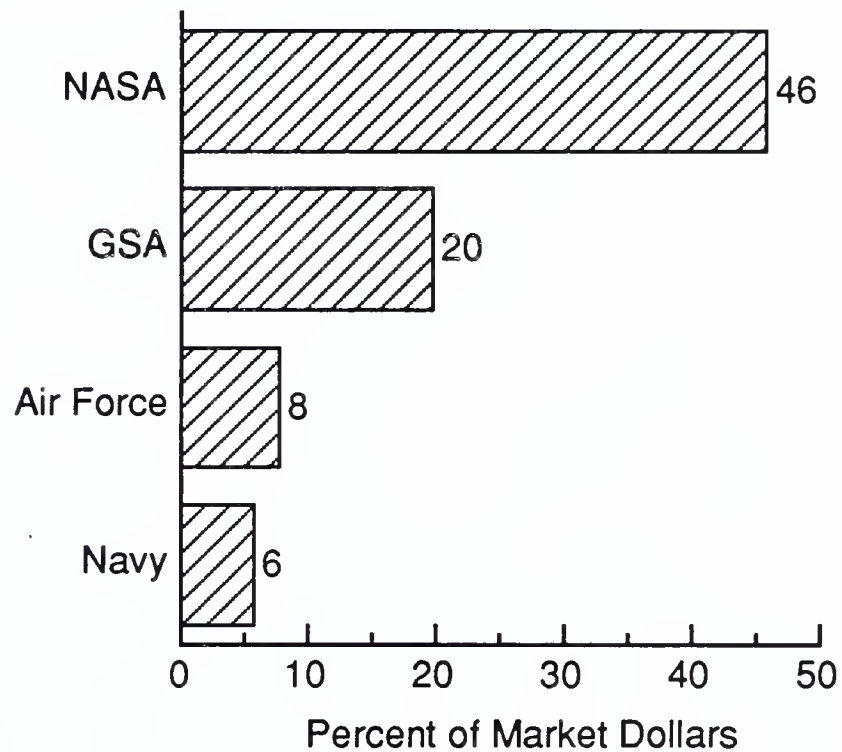
Source: Pinpoint, 10/91, GFY 1990

The heaviest users of systems analysis services during GFY 1990 were two civil agencies, accounting for 66% of the dollars spent in this category. The largest user was NASA (46%) because of its dependence on contractors for complex systems analysis expertise (see Exhibit IV-3).

EXHIBIT IV-3

Federal Government Professional Services Top Four Agency Users, GFY 1990 Service Category: Systems Analysis

Agency



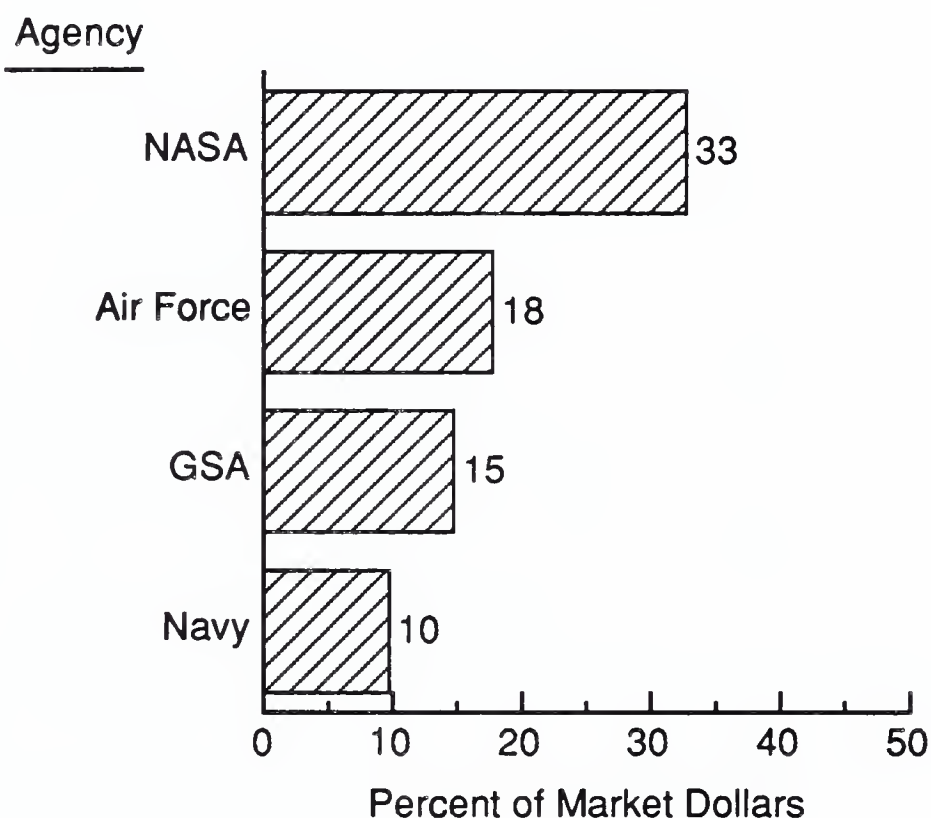
Source: Pinpoint, 10/91, GFY 1990

NASA was also the largest user of contractor programming services, as shown in Exhibit IV-4. NASA's diverse technical needs provide numerous opportunities for professional services contractors.

Vendors specializing in offering specific types of professional services need to market to agencies that are the largest users of contractor assistance in those areas. However, continued popularity of A-76 principles may open up more agencies to contractor support, provided Congress does not pass a bill to replace OMB A-76. Legislative action could result in restrictions favoring civil service performance.

EXHIBIT IV-4

**Federal Government Professional Services
Top Four Agency Users, GFY 1990
Service Category: ADP Programming Services**

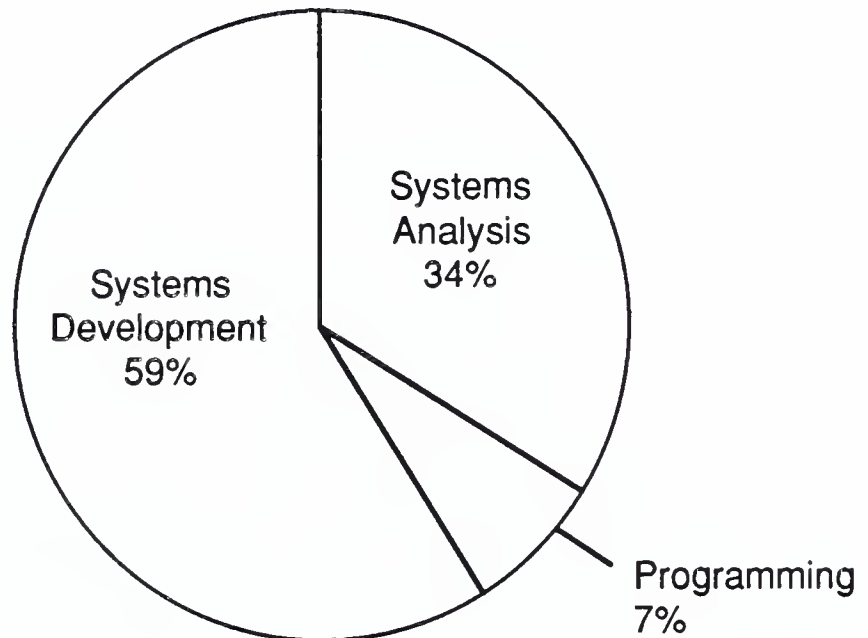


Source: Pinpoint, 10/91, GFY 1990

1. Professional Services Budget Distribution

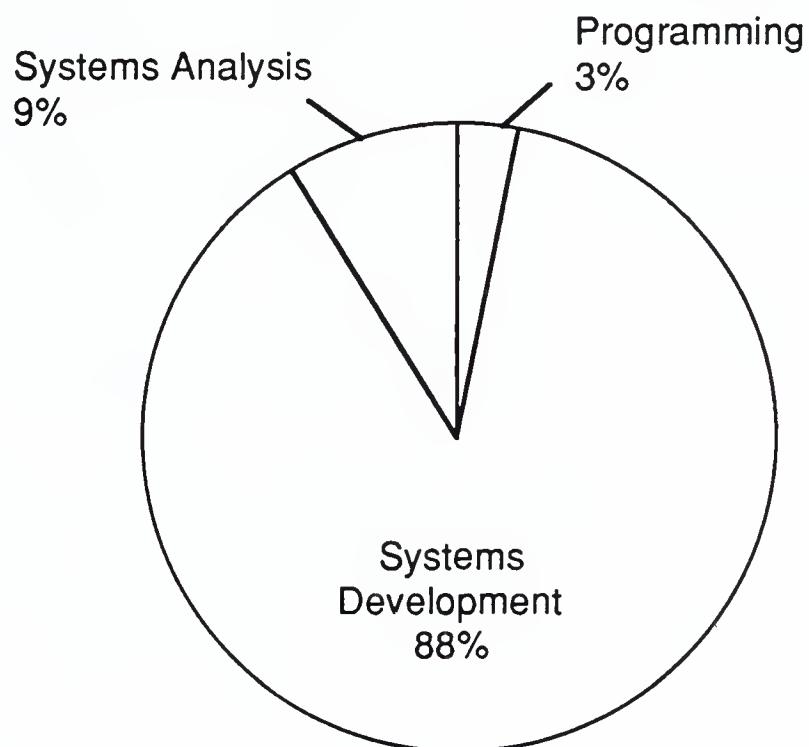
INPUT's analysis revealed that there were significant differences but also some similarities in the distribution of the professional services budgets of the DoD and of the civil agencies, as shown in Exhibits IV-5 and IV-6.

EXHIBIT IV-5

Professional Services Budget Distribution by Service Category—Civil Agencies

Source: Pinpoint, 10/91, GFY 1990

EXHIBIT IV-6

Professional Services Budget Distribution by Service Category—Defense Agencies

Source: Pinpoint, 10/91, GFY 1990

ADP programming services constitute the smallest portion of 1990 expenditures for both types of agencies. Agencies appear to rely on in-house personnel to perform programming needs after contractors have completed systems analysis and development functions. Systems development activities represent a larger proportion of civil agencies' professional services budgets.

However, the data reported to the Federal Procurement Data Center is circumspect. Data entry functions are largely performed by agency personnel having little or no knowledge of information technology. In addition, GSA does not provide definitions that make distinctions between programming and systems development to assist data entry personnel. GSA contract award data will continue to be circumspect as long as agency personnel remain untrained in correct code categories.

2. Application Areas

As might be expected, agencies used professional services contracts for a wide range of applications. In an earlier version of this report, INPUT surveyed agencies on their applications plans for professional services contracts. Exhibits IV-7 and IV-8 summarize this data for civil and defense agencies.

EXHIBIT IV-7

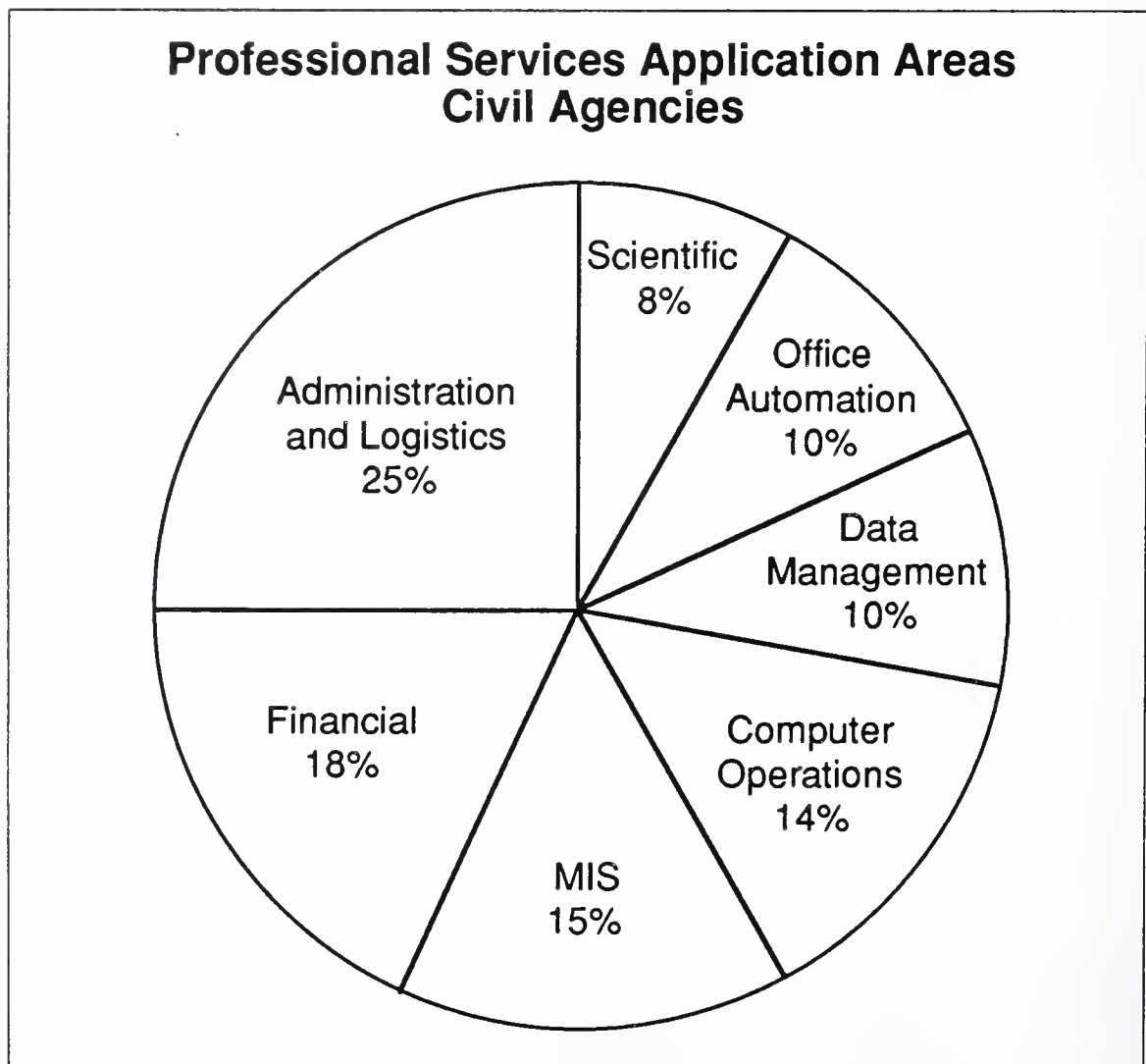
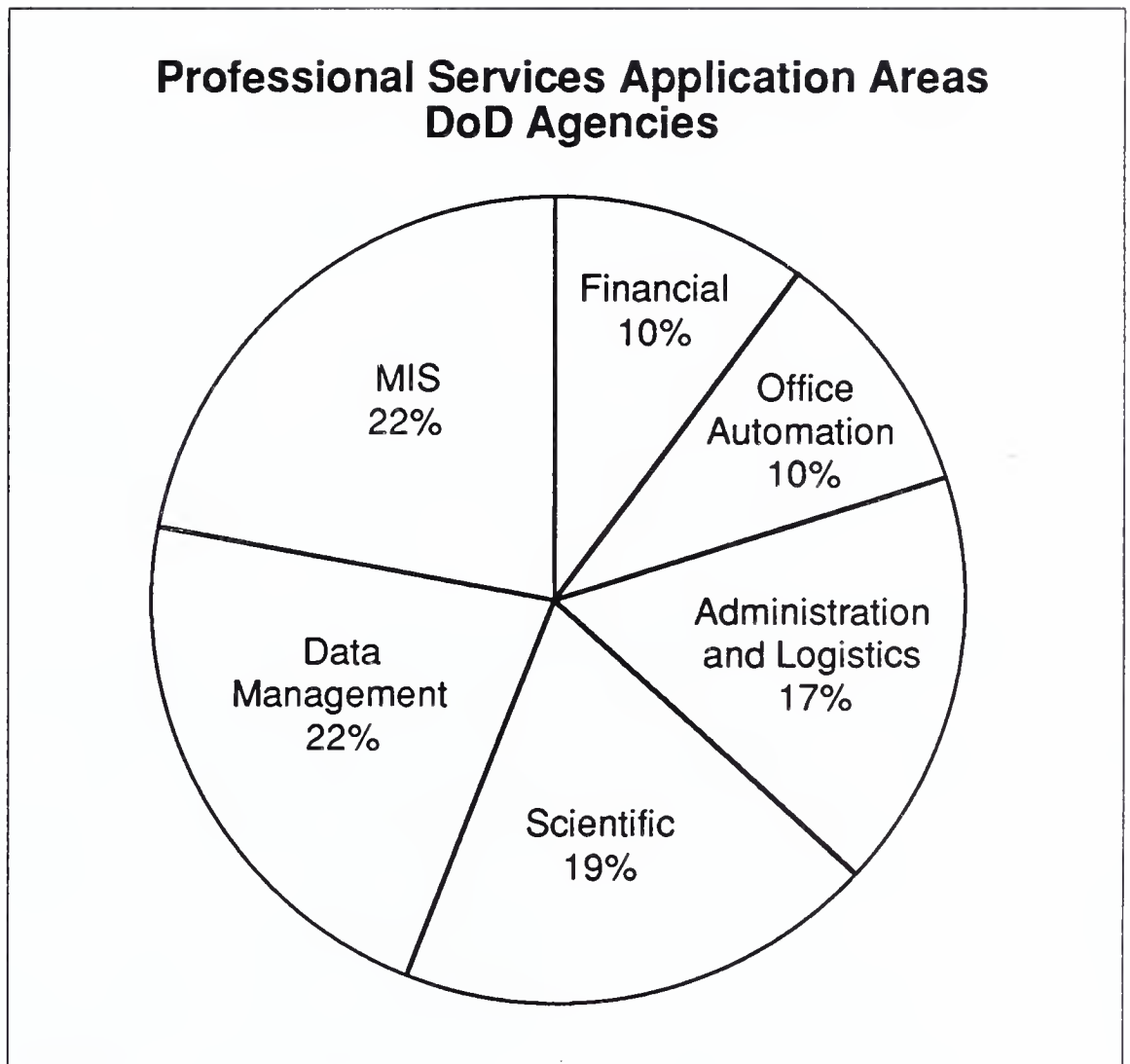


EXHIBIT IV-8



The data has been normalized somewhat to allow for a comparison of categories. Though most of the categories are obvious, some require explanation:

- Administration and logistics includes the housekeeping functions required to operate federal agencies, such as personnel, procurement, and ordering supplies.
- MIS includes support for the IRM organizations in such typical areas as technical consulting, software development, and performance measurement.
- Data management includes the control and dissemination of data to federal agencies, such as provision of data base services and structuring of data bases in support of specific applications.

In both DoD and civil agencies, the predominant applications for which professional services were contracted were those associated with general data processing in support of management/administrative requirements. Financial applications and logistics made up the largest specific applications. Other applications covered a range of information systems and appeared to be unique to the individual needs of each agency. Other systems frequently mentioned included such tactical directions as LANs, distributed processing, and centralized data bases. While still a less-frequent target, office automation continues to be an application for which agencies buy professional services. Applications tend not to be esoteric in nature, but rather "plain vanilla" systems that serve as the backbone of each agency. The new technologies such as image systems and geographic information systems also require high levels of technical expertise from contractors.

While scientific applications made up a relatively small portion of the civil area, they represented nearly one-fifth of the defense applications. This is somewhat surprising, in view of the scientific emphasis of some civil agencies, such as Commerce, NASA, and Energy. Commerce uses in-house staffs and academic personnel. Most Energy facilities are operated by facilities management prime contractors (like Martin Marietta at Oak Ridge) who rarely contract for outside support. NASA alone uses contractors exclusively for applications development, in response to in-house scientists' needs.

INPUT's subsequent surveys suggested that many agencies have increased their interest in mission-oriented applications that require custom software development. These applications reflect the business of the agencies, such as a tax audit system at IRS, a patient eligibility system at VA, or a polluted site tracking system at EPA. Many agencies prefer to seek custom software to satisfy their needs. However, agencies are now subject to administrative and financial pressures to use commercial software packages when possible to support these applications.

D

Agency Perceptions of Professional Services

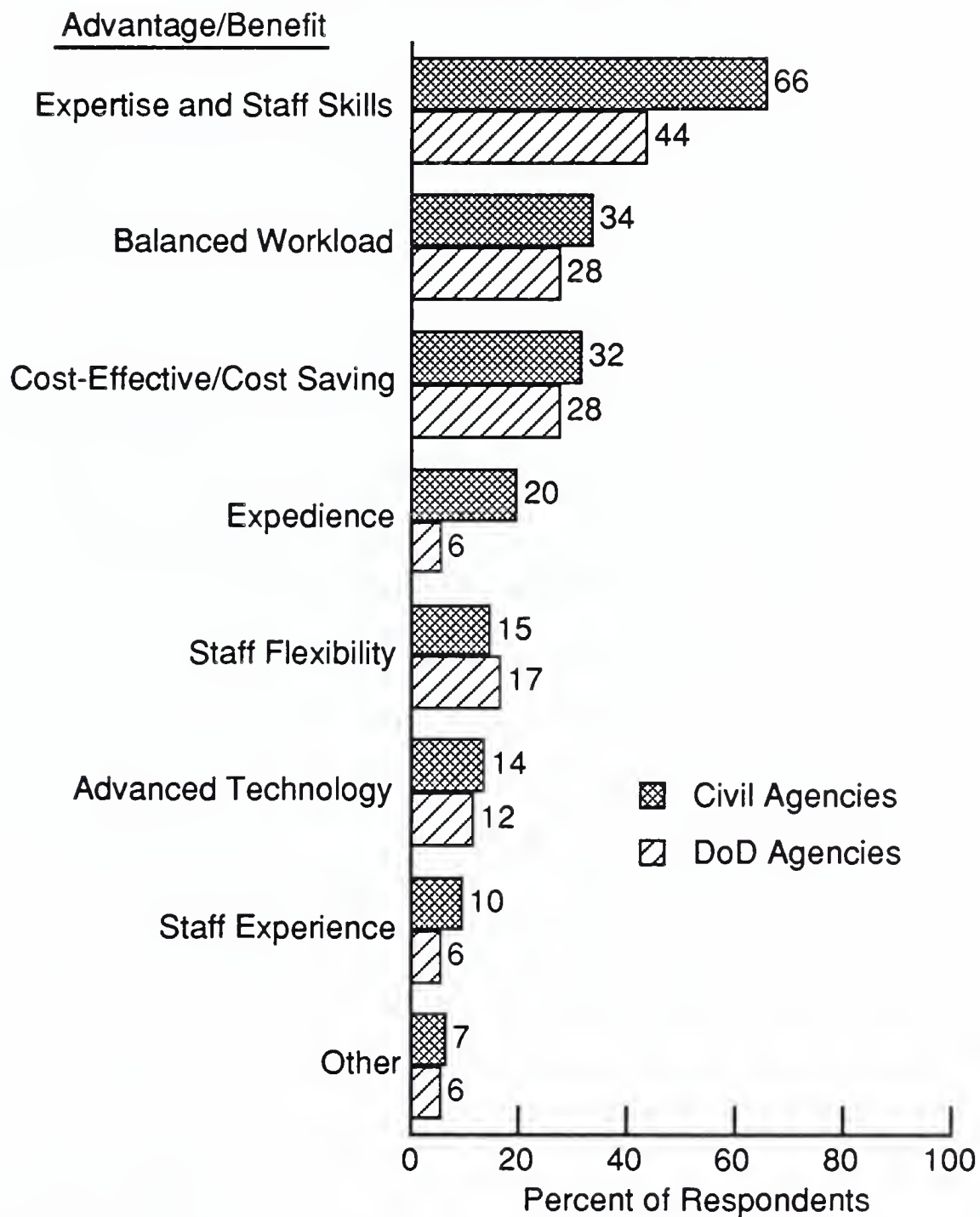
1. Advantages/Benefits of Professional Services

Civil and DoD agencies use professional services contracts primarily because contractors provide experience and expertise not available extensively within the agency, as shown in Exhibit IV-9. This data has not changed from findings from earlier surveys. Totals add to more than 100% due to multiple responses.

Professional services contracts give the agency the ability to balance workloads without increasing or decreasing government staff as requirements are added and/or removed. Some government respondents believe that contractor labor is less expensive than government employee labor in performing the same tasks. In addition, fixed-price contracting enables the government to put a ceiling on overall costs. As the federal budget continues to tighten, cost control becomes more critical.

EXHIBIT IV-9

Agency Views of Advantages/Benefits of Professional Services



Objectivity, which includes the ability of the contractor to take an unbiased approach to a problem and not be affected by internal agency politics, is essential. The civil agencies considered expediency advantageous. Expediency can be measured in terms of accelerated schedules, as well as in terms of fewer problems with government rules, regulations, and policies than if the work were performed in-house.

2. Disadvantages/Liabilities of Professional Services

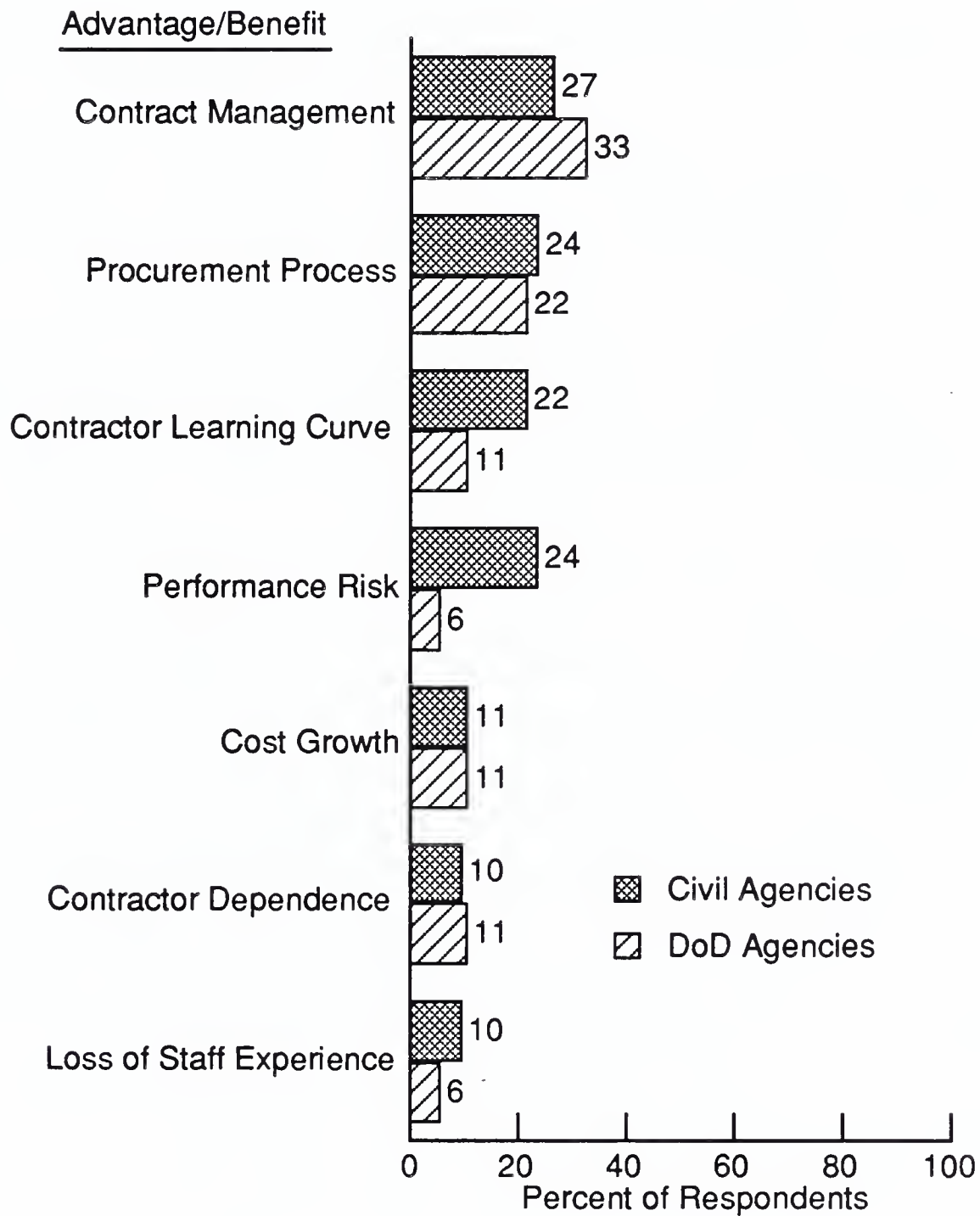
The difficulty in managing contracts for professional services was the primary disadvantage described by both DoD and civil agencies, as shown in Exhibit IV-10. Performance risk, or government agencies' concern that the contractor could not deliver or would deliver an unacceptable product, was considered a significant liability by civil agencies. Adherence to schedule was also a factor.

The problems associated with procurement, including the long lead time required for contracting and the risk of protest by losing bidders, are considered disadvantages by the agencies. The learning curve, or the time it takes contractors to "come up to speed" on the problem, was considered a liability by 22% of the civil agencies and by 11% of the DoD respondents. This is especially important on low-price "body shop" contracts, where turnover runs especially high.

Although, as described in the previous section of this report, agencies could not accomplish all of their assigned work without contractor support, it is considered by some to be a disadvantage to become dependent on a contractor. The consensus of those who considered this a disadvantage was that contracting for professional services weakened agency ability to do further work because the contractor ended up with most of the expertise in this area of work. This also helps the contractor prolong services to the client.

EXHIBIT IV-10

Agency Views of Disadvantages/Liabilities of Professional Services



E

Case Studies of Professional Services Contracts

In this section, case studies of professional services projects that have either been completed or are well into the contract life cycle are presented. The data was provided by prime contractors. The case studies illustrate how contractors attempt to satisfy complex systems needs by providing consulting services, software development, and education and training functions. Summary contract data is also shown (when available) to depict how various project requirements can affect contract type.

FEDERAL PROFESSIONAL SERVICES PROJECT CASE STUDY

Program Name: Office Automation (OA)
Department: Department of Commerce
Branch: National Oceanographic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)

**Mission Problem/
Function:**

To allow NMFS personnel to use automated systems, to raise productivity, and to assist in the analysis, planning, and implementation of expanded and upgraded systems and facilities.

**Major Tasks
Performed**

- Molded and led the project team
- Performed studies
- Planned, selected, and implemented a LAN of PCs and provided support

Contract Information

Type	Amount	Duration
Fixed Fee	\$1.6 million	5 years

Schedule

RFP Release	Bid Due	Award	Completion
UNK	UNK	4/1/85	3/90

Contractor(s)

	Company	Function
Prime Contractor	ASG	Office Automation Support
Subcontractor	GTSI	LAN Installation
Outside Consultant	Ted Gaughon	Cable Plant Analysis

Project Components Overview

Professional Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Consulting Services	O
Software Development	P
Education/Training	P

Project Components Detail

Consulting Services
\$200,000

	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Systems Management Consulting	P
Services Management Consulting	P
Technical Project Assistance	P
Management Project Assistance	P
Feasibility Analysis	P
Cost-Effectiveness Trade-Off Studies	P

Software
Development
\$300,000

Applications Developed/ Modified	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Mainframe Applications	P,O
Network Applications	P
Microcomputer Applications	P,O
Hybrid Applications	P

Software Development Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
User Requirements Definition	P,S
Systems Design	P,S
Contract Programming	P,O
Software Documentation	P

Education and
Training
\$100,000

Contractor Responsibility	P,O
---------------------------	-----

Education and Training Services
Vendor instruction of user personnel in operations
Vendor instruction of user personnel in programming
Instructor-led classes and workshops
Personal tutoring services
User group workshops and information sheets

Additional Services

Contractor Responsibility (P=Prime, S=Sub, O=Other)	
Communications Planning	P
Equipment and Systems Evaluation	P
Operations Coordination	P
Feasibility Studies	P
Management Studies	P

Original Funding

\$900,000

Project Scope

Agency-issued contract amendments to increase the scope of the contract.

Project Status

Completed.

FEDERAL PROFESSIONAL SERVICES PROJECT CASE STUDY

Program Name: **ADP Omnibus Support Services Contract**

Department: **Naval Weapons Support Center, Crane**

Branch: **Ordnance Engineering Department**

**Mission Problem/
Function:**

ADP software development, maintenance, and site implementation services. These services enhance and provide maintenance support for the Ordnance Management System (OMS), the Fleet Optical Scanning Ammunition Marking System (FOSAMS), Non-Nuclear Ammunition Inventory Accuracy (NAIA) Program, and other AIS support services.

**Major Tasks
Performed**

- ADP Studies
- Provided development, design, maintenance, documentation, and training

Contract Information

Type	Amount	Duration
CPFF-LOE	\$71 million	8 years

Schedule

RFP Release	Bid Due	Award	Completion
2/17/89	7/24/89	2/21/90	2/20/98

Contractor(s)

	Company	Function
Prime Contractor	CACI, Inc.	Project management, design, development, training, site implementation
Subcontractor	CDSI	ADP security, telecommunications
Subcontractor	Concepts (EMC) Engineering	Programming, training, management site implementation

Project Components Overview

Professional Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Consulting Services	P,S
Software Development	P,S
Education/Training	P,S

Project Components Detail**Consulting Services**

	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Systems Management	P
Services Management	P
Technical Project Assistance	P,S
Management Project Assistance	P,S
Feasibility Analysis	P,S
Cost-Effectiveness Trade-Off Studies	P,S

Software
Development
\$10,000,000

Applications Developed/ Modified	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Unify	P
UNIX	P
BASIC	P,S

Software Development Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
User Requirements Definition	P
Systems Design	P
Contract Programming	P,S
Software Documentation	P,S

Education and
Training
\$8,000,000

Contractor Responsibility	P,S
---------------------------	-----

Education and Training Services
Vendor instruction of user personnel in operations Vendor instruction of user personnel in programming Vendor instruction of user personnel for maintenance

Original Funding	\$25 million
Project Scope	Has not changed since contract award.
Project Status	Client is currently assessing funding versus the original scope of work. The client is trying to bring support in line with the annual funding ceiling.

FEDERAL PROFESSIONAL SERVICES PROJECT CASE STUDY

Program Name: **Transportation Computer Center**

Department: **Department of Transportation**

Branch: **Office of the Secretary**

**Mission Problem/
Function:**

Support all aspects of Amdahl computer operations, systems programming, and network communications.

**Major Tasks
Performed**

- Improve central site operations
- Improve system reliability
- Increase training availability
- Increase office automation and LAN presence

Contract Information

Type	Amount	Duration
CPAF	\$36 million	4 years

Schedule

RFP Release	Bid Due	Award	Completion
12/86	2/87	4/88	9/92

Contractor(s)

	Company	Function
Prime Contractor	Unisys	ADP Services Support
Subcontractor	CBSI	Office Automation

Project Components Overview

Professional Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Consulting Services	P
Software Development	P
Education/Training	P

Project Components Detail

Consulting Services
\$4,000,000

	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Systems Management Consulting	P
Services Management Consulting	P
Technical Project Assistance	P
Management Project Assistance	P
Feasibility Analysis	P
Cost-Effectiveness Trade-Off Studies	P

**Software
Development
\$10,000,000**

Applications Developed/ Modified	Contractor Responsibility (P=Prime, S=Sub, O=Other)
Financial Systems	P
Invoice System	P
Office Automation Systems	P
Presentation Systems	P

Software Development Services	Contractor Responsibility (P=Prime, S=Sub, O=Other)
User Requirements Definition	P
Systems Design	P
Contract Programming	P
Software Documentation	P

**Education and
Training
\$1,500,000**

Contractor Responsibility	S
---------------------------	---

Education and Training Services
Computer-aided instruction Computer-based education Vendor instruction of user personnel in operations Vendor instruction of user personnel in programming Documentation services

Original Funding

\$18,000,000

Project Scope

The agency modified the statement of work to increase the project scope.

F**Acquisition Plans and Preferences****1. Characteristics of a Successful Contractor**

Agencies surveyed in previous studies showed sharp differences of opinion on successful contractor characteristics (see Exhibit IV-11). In particular, civil agencies ranked staff experience first, while DoD agencies ranked it fifth. Vendor opinions more closely paralleled those of the civil agencies.

EXHIBIT IV-11

Rankings of Characteristics of Successful Contractors

Characteristic	Ranking*		
	Civil Agencies	DoD Agencies	Vendors
Price	2	1	1
Support	4	4	7
Staff experience	1	5	2
Software development experience	3	1	3
Application/functional experience	4	3	6
Federal contract experience	6	7	4
Agency experience	7	5	4

*Ranking: 1 = Most Important, 7 = Least Important

In presenting the choices, INPUT did not attempt to distinguish between vendor price and agency cost. Typically, price represents the quoted charges for performing the work, while cost represents the final payment requirements of the agency. However, for the purposes of this survey, the two terms were treated as one.

The civil agencies and the DoD concur that application/functional experience is an important characteristic, whereas vendors consider it less important. Differences in ratings for federal contract experience and agency experience exist between the agencies and vendors. Vendors assigned an important rating to both factors, while the agencies themselves gave these factors the lowest ratings for importance.

2. Selection Criteria

Agency ranking of selection criteria tends to change from one survey to the next. However, the proposed technical solution usually remains at the top of the list. Exhibit IV-12 shows that both vendor reputation and staff experience ranked ahead of cost. INPUT's research outside of this survey, however, contradicts this ranking. In particular, most federal evaluation models rank cost second, if not first.

EXHIBIT IV-12

Relative Ranking of Criteria Used in Selecting a Professional Services Vendor

Selection Criteria	Ranking
Proposed technical solution	1
Vendor reputation	2
Staff experience	3
Cost	4
Project management	5

Cost is usually ranked first on low-priced "body shop" type procurements in which company multipliers in the range of 1.3 to 1.5 are typically bid. This means that, for such areas as contract programmers or computer operators, the vendor bills the government for 1.3 to 1.5 times the employee's salary. Benefits are low and attrition, as might be expected, can be quite high. The government almost always awards these contracts based on lowest cost, and then often regrets the decision later on. Poor vendor performance from low-priced, short-term personnel often costs the government more in the long run.

For high-level consulting jobs and other professional services contracts, particularly those with functional specifications, the proposed technical solution may indeed rank higher than cost. The ranking in Exhibit IV-12 reflects the preferences of the respondent population, mainly agency program managers. Contracting officers rarely participate in surveys, thus preventing their views from being properly represented.

3. Contract Types

The federal agencies surveyed indicated that they have a slight preference for using a mixture of contract types for professional services, as shown in Exhibit IV-13. This preferred approach is a mixture of cost-plus, fixed-price, and other types of contracts, including incentive, fixed labor, and time-and-materials contracts. Many respondents recognized the inherent difficulties in pricing programming and analysis projects by preferring cost-plus contracts in this area, and reserving fixed-price contracts for situations where the requirements are well defined.

EXHIBIT IV-13

Federal Agency Contract Type Preference for Professional Services

Contract Type Preference	Percent of Respondents	Reasons Cited
Cost-Plus	6	Research oriented/ developmental services
Cost-Plus Incentive Fee	30	Nonspecific requirements Innovative/creative More valuable to agency
Fixed-Price	30	Requirements well defined Reduces government liabilities Government retains control
Mixed/Other	34	Depends on type of service Time and materials gives flexibility

Agencies were also queried on the future use of Multiple Award Basic Ordering Agreements to acquire professional services (see Exhibit IV-14). Some agency officials have limited experience with BOAs, but expected use to increase as a means of reducing procurement lead time. GSA, in

particular, has taken the lead in establishing Systems Engineering and Technical Assistance (SETA) contracts. These are issued from both the regional offices (for regional coverage) and the GSA's Office of Technical Assistance (OTA) in Falls Church, VA (for national coverage).

EXHIBIT IV-14

Changes in Agency Use of Basic Ordering Agreements (BOAs)

Change in BOA Use	Percent of Respondents
Increasing	67
Decreasing	17
Remaining the same	8
Little experience	8

G

Projected Trends in the Use of Professional Services

1. Increases/Decreases in Contracting

Past surveys have shown that agencies have little interest in increasing professional services contracting. This corresponds with high-level agency budget data, as well as INPUT's compilation of professional services opportunities. Though they do not expect increases in the programs they manage, more agencies contract out programs as needs outweigh preferences. At any rate, the survey data reflect dampening growth prospects in some professional services delivery modes.

2. Transition/Conversion to In-House Support

When a professional services contract is completed, the government is faced with a choice—should the continued support be transferred in-house, or should that continued support be obtained from a vendor? Civil agencies preferred to convert the program to contractors for continued support services. Half of the DoD agencies surveyed had no clear policy and made a decision based on the circumstances of the specific project.

As a follow-up to this question, INPUT asked the government agencies surveyed to reveal any plans to either convert professional services contracts to in-house or to convert in-house support functions to outside contractor support. Exhibit IV-15 shows that while there are many more plans to convert in-house support to outside contractor support than vice versa, there is a growing body of agencies with plans to move services and support from contractors in-house. With the current shortfall of staff and funds, it may be that these plans more accurately reflect contract prioritizations—that is, only priority projects will be contracted and other projects will be scheduled as time and money permit.

EXHIBIT IV-15

Agency Plans for Conversion of Current Professional Services and Support

Planned Conversion	Percentages	
	Civil Agencies	DoD Agencies
From contractor to in-house staff	24	30
From in-house staff to contractor	51	60
No conversion plans	25	10
Total	100	100

3. Reasons for Transition/Conversion

In a few reported instances, the reasons government agencies planned to convert professional services contracts to in-house support were to reduce costs and to minimize reliance on contractors. The DoD was more concerned about cost reduction. The civil agencies, except for NASA and Energy, were more concerned about minimizing their dependence on contractors. The Navy has a program to bring various types of engineering support in-house.

The reasons government agencies planned to convert in-house functions to outside contractor support were to:

- Take advantage of expertise not available within the government
- Balance workloads and supplement in-house staffs
- Reduce costs

- Expedite services to the public
- Satisfy the requirements of government policy, in particular OMB Circular A-76

Many agencies were more reluctant to contract out for mission-critical systems, expressing the need for better control. However, NASA remains a notable exception to this trend.

4. Factors Affecting Future Use of Professional Services

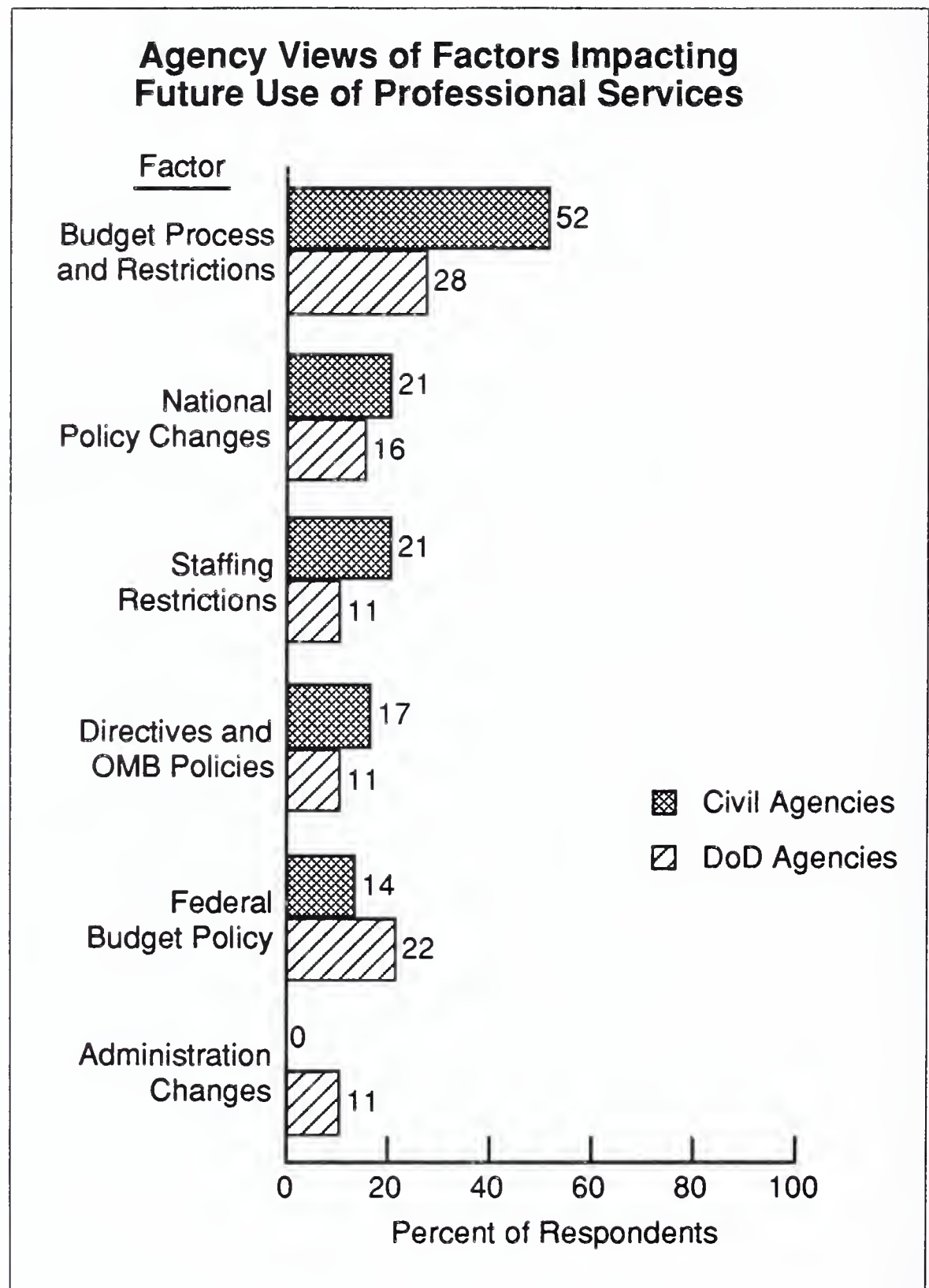
From the perspective of the government respondents, the nontechnical factors that were expected to affect the future use of professional services by the federal government were the same for both defense and civil agencies, as shown in Exhibit IV-16. However, the degree of impact of these factors differs.

Funding issues headed the list of concerns for both civil and DoD agencies, but more civil respondents mentioned this factor. This suggests that civil agencies were reflecting the priorities of the then-current administration. Further, most defense funding was for programs already in place, rather than for new initiatives and therefore new opportunities.

Directives and OMB policy factors continued to be an issue, with marginally more civil respondents perceiving a significant impact on future use of professional services. Agency respondents cited that the OMB Circulars, especially OMB A-120, which contains guidelines for use of consulting services, have made it more difficult to contract for professional services. Some respondents were hopeful that the proposed revisions to the FIRMR will clarify the definition of ADP support services and provide some assistance to contracting officials. The recent revision of the FIRMR has made some progress in addressing the definition problem. Federal Information Processing (FIP) replaces the term ADP. The language used in the definition of FIP Support Services is somewhat vague. However, the abundant examples listed in the first bulletin should clarify the new definition. OMB expected to revamp A-120 beginning in January 1992.

Included with directives and OMB policies, GSA policies were noted because they constantly subject to change. Some respondents believed that the General Services Administration was attempting to make it easier for agencies to buy services. This reflects the need for better management within the federal government and the sense that the current administration has little faith in the ability of civil servants.

EXHIBIT IV-16



There were, however, countervailing trends. Changes in leadership at both GSA and the House Government Operations Committee signaled a shift in GSA's policies. GSA's style of accommodation and facilitation—notable in the Frank Carr era—gave way to a more confrontational relationship between GSA and the agencies. This occurred because of congressional pressure, from John Conyers and others, to find out why ADP systems overrun their projected costs and to ferret out unfair procurements.

Federal personnel policies were also identified as an incentive to increase the use of professional services firms. Practically all agency executives that INPUT interviewed cited difficulty in hiring staff with strong technical credentials. In the Washington area, at least, good candidates often obtain higher salaries and better benefits in the private sector than in the government. The exodus of government employees with fewer than 15 years of service to the private sector continues. Thus agency executives, usually with more than 20 years of service themselves and looking toward retirement, must contract out most of their technical support activities.

Another critical need exists in the area of contract administration. Contracting Officers' Technical Representatives (COTRs) are often inadequately trained for their jobs. This leads to their insecurity, manifesting itself in two unfortunate ways:

- Some COTRs accept virtually everything the vendor tells them, leading to poor government oversight of the contracted project.
- Some COTRs accept virtually nothing the vendor tells them, finding security in doing everything by the book. This often leads to delays and inadequate attention to the government's real problems.

GSA's training initiatives for the Trail Boss program are a major step toward improving contract administration. Through Trail Boss, agency executives are expected to learn, among other things, the proper techniques for dealing with contractors. This knowledge may then trickle down to the staff that deals directly with contractors on a daily basis. The good COTR is fair and flexible, but sometimes firm. As agencies increase their dependence on professional services firms, better contract administration will likely result.

Agency representatives were also asked to identify technical factors that would alter their agency's professional services plans. More than 25 factors were identified, and the five that were named most frequently are listed in Exhibit IV-17.

The personal computer has a two-way effect on the federal professional services market. On one hand, their greater functionality and wider penetration have increased federal end-user computing, thus reducing the need for contract programmers. On the other hand, many agencies require more trainers and consultants to support these end users. Thus, while ranking first in agency surveys, personal computers are exerting opposing forces on the market.

Historically, defense agencies have installed more local-area networks (LANs) than have civil agencies. Therefore, it is not surprising that defense agencies ranked LANs higher. However, since INPUT surveyed agencies in this market, new market studies track a proliferation of LAN networks growing at civil agencies.

EXHIBIT IV-17

Technological Factors Affecting Future Government Spending for Professional Services

Factor	Ranking*	
	Civil Agencies	DoD Agencies
Evolution in use of personal computers	1	1
Developments in software development and maintenance	2	4
Improvements in end-user capabilities	3	5
Changes in microcomputer architecture	4	2
Proliferation of LANs	5	3

* Rank based on frequency of mention by respondents.

5. Suggestions for Future Improvements to Vendor Services

Agency respondents were questioned about how vendors might make their professional services more valuable to the federal government over the next five years. As should be expected, the replies varied due to the differing experiences respondents have encountered with vendors (see Exhibits IV-18 and IV-19).

The responses were normalized somewhat to present coherent views. However, responses from civil and defense agencies were not always comparable. The civil agency responses focused primarily on the relationships between federal and vendor personnel. Defense agency comments, on the other hand, centered more on the level of technology support, in terms of products, services, and personnel. Both groups stressed the need for better understanding of agency needs, suggesting that vendors need to empathize better with their clients.

Agency representatives also gave responses to the question of how effectively vendors completed teaming arrangements. Respondents were in agreement that vendors are already doing a fair job, but that some improvements could be made. Shortcomings were in the area of acquiring specialization, project management, and staff expertise. Also noted were significant problems among teaming members and a lack of communication between the government and the team members to respond to government needs. In some cases, agency executives also found themselves in the position of arbitrating disputes among team members.

EXHIBIT IV-18

Civil Agencies' Suggestions for Improvements to Vendor Services

Suggestions	Rank*
Increase cooperation and responsiveness to agency needs	1
Increase experience of staff	2
Increase adherence to agency pricing policy	3
Increase management skills	4
Increase availability of off-the-shelf software	5

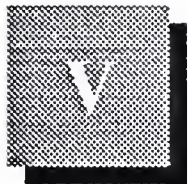
*Rank based on frequency of mention by respondents.

EXHIBIT IV-19

**Defense Agencies' Suggestions for
Improvements to Vendor Services**

Suggestions	Rank*
Increase availability of integrated services	1
Increase awareness of DoD standards	2
Increase use of fourth-generation tools for development	3
Increase work force's knowledge and ability	4
Increase awareness of agency requirements	5

*Rank based on frequency of mention by respondents.



Competitive Trends

A

Vendor Participation

Exhibit V-1 displays a profile of vendor respondents from three perspectives—total corporate revenue, professional services revenue, and percentage of professional services revenue from the federal government. This data was developed primarily from earlier survey efforts. The vendor respondents represented many of the largest professional services suppliers to the computer industry as a whole and to the federal government sector.

INPUT LIBRARY

EXHIBIT V-1

Revenue Characteristics of Respondent Professional Services Vendors

Corporate Revenue (\$ Millions)	Percent
Less than \$500 million	38
\$500 million to \$1 billion	24
Over \$1 billion	38

Professional Services Revenue (\$ Millions)	Percent
0 to 100	8
100 to 250	25
250 to 500	42
Over 500	25

Government Percent of Professional Services Revenue	Percent of Vendors
Less than 20%	8
20% to 80%	24
80% to 100%	68

The vendors surveyed generally sold each of the categories of professional services shown in Exhibit V-2. Revenue distribution parallels the industry, with software development and consulting as the primary revenue sources.

EXHIBIT V-2

Types of Professional Services Provided by Respondents

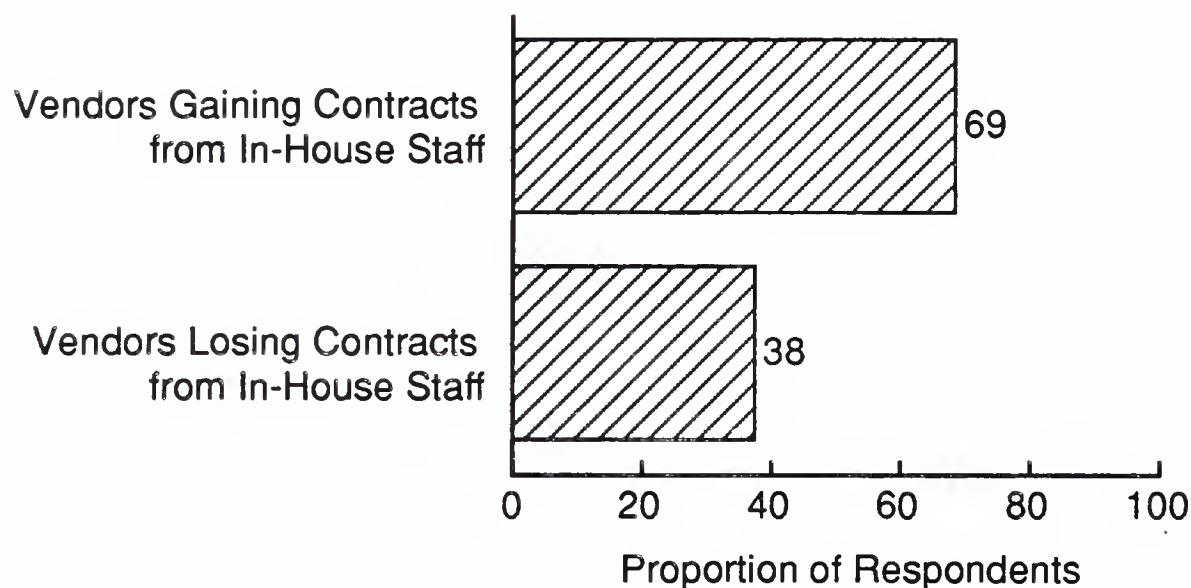
Category	Proportion of Respondents		
	Currently Providing (Percent)	Plan to Provide (Percent)	Average Percent of Respondent Revenues
Design and Consulting	92	100	29
Education and Training	75	83	5
Software Development	92	100	30

Vendors planned to provide additional professional services in the future in response to demands from government customers. A primary reason for this was expected demand in response to the government's emphasis on OMB A-76 policy. In addition, some government customers preferred a single contractor to be responsible for all aspects of developed systems.

As depicted in Exhibit V-3, vendors won professional service contracts for support functions (that were previously performed in-house) more frequently than they lost them. The percent of contracts gained from in-house staff remains roughly the same as in an earlier study, but the share of vendors experiencing a loss of contracts has declined. This situation reflects the agencies' continuing shortage of in-house staff available to perform support services. INPUT expects this trend to continue with more central design activities (CDA)—especially in defense—being contracted out.

EXHIBIT V-3

Professional Services Competition from In-House Government Staff



Note: Total exceeds 100% because the results were not mutually exclusive.

As shown in Exhibit V-4, the experience of the vendors surveyed was that most frequently follow-on support for professional services contracts with the government for design, programming, and analysis was provided outside the agency by the original vendor. In-house follow-on support decreased rapidly, while third-party follow-on support kept pace at approximately the same amount as previously reported.

EXHIBIT V-4

Source of Follow-on Support for Professional Services Contracts

Source of Follow-on Support for Completed Professional Services Contracts	Proportion of Respondents (Percent)
In-house by government	8
Outside agency by original vendor	77
Outside agency by another vendor	15
Total	100

- The type of work moved in-house to government staffs typically ranged from software maintenance to design and consulting. Applications ranged from administrative and financial systems to avionics systems and shipboard computing systems.
- The agencies' primary reason for moving the work in-house was to involve government personnel in the work and to eliminate reliance of the government on vendor personnel support of agency work. The Navy has embarked on an ambitious program in this area. A secondary reason was to reduce costs by minimizing the amount of effort assigned to maintain software systems. Infrequently, the decision to move the work in-house is part of an OMB A-76 cost comparison.
- The majority of follow-on professional services support provided by vendors was for software maintenance, and education and training, but there were several instances of design and consulting, and software development. Applications included administrative and financial systems; data bases; shipboard weapons systems; and environmental, health, and energy systems.
- Most often the government utilizes contractors for follow-on support because either the agency does not have sufficient staff and/or the expertise to perform the tasks, or an OMB A-76 cost comparison indicates that contracting is more cost effective.

B

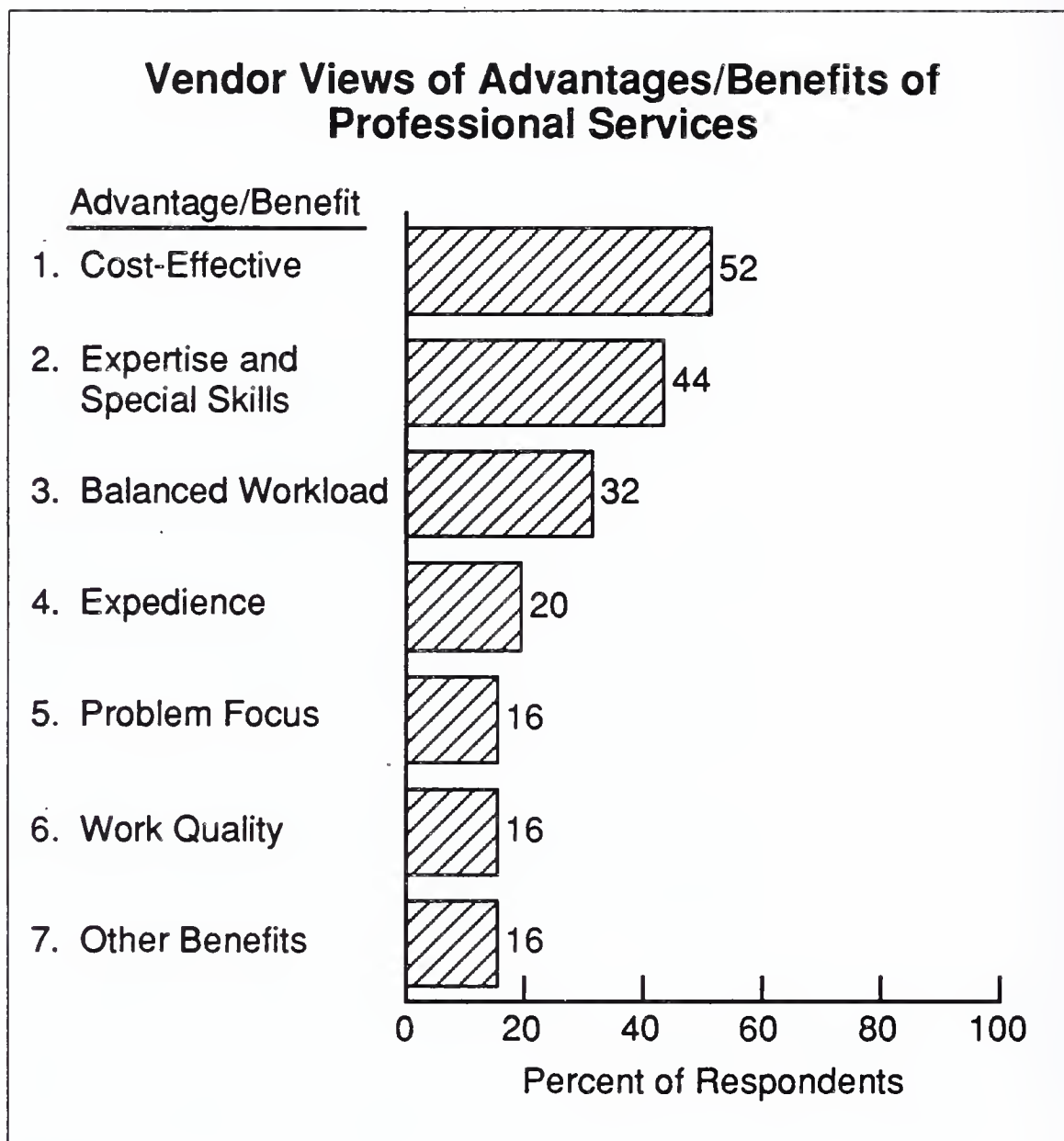
Vendor Market Perceptions

1. Advantages/Benefits of Contracting

Vendors surveyed by INPUT typically had wide-ranging opinions about the advantages and benefits to the federal government of using professional service contracts. Vendor opinions are shown in Exhibit V-5. Similar agency perceptions were presented in Exhibit IV-9. Agencies considered expertise more important than vendors did, and placed considerably less emphasis on cost than did vendors.

- The ability to obtain expertise not available within the government agency was seen as a primary reason for the government to contract for professional services. Vendors believe that specialized skills are more easily obtained by contracting and that contractors can respond quickly with new skill mixes as requirements change.
- Lower cost in achieving results was also seen as a primary advantage in contracting for professional services. Vendors believed that the competitive environment allows the government to contract for professional services more cost effectively.

EXHIBIT V-5

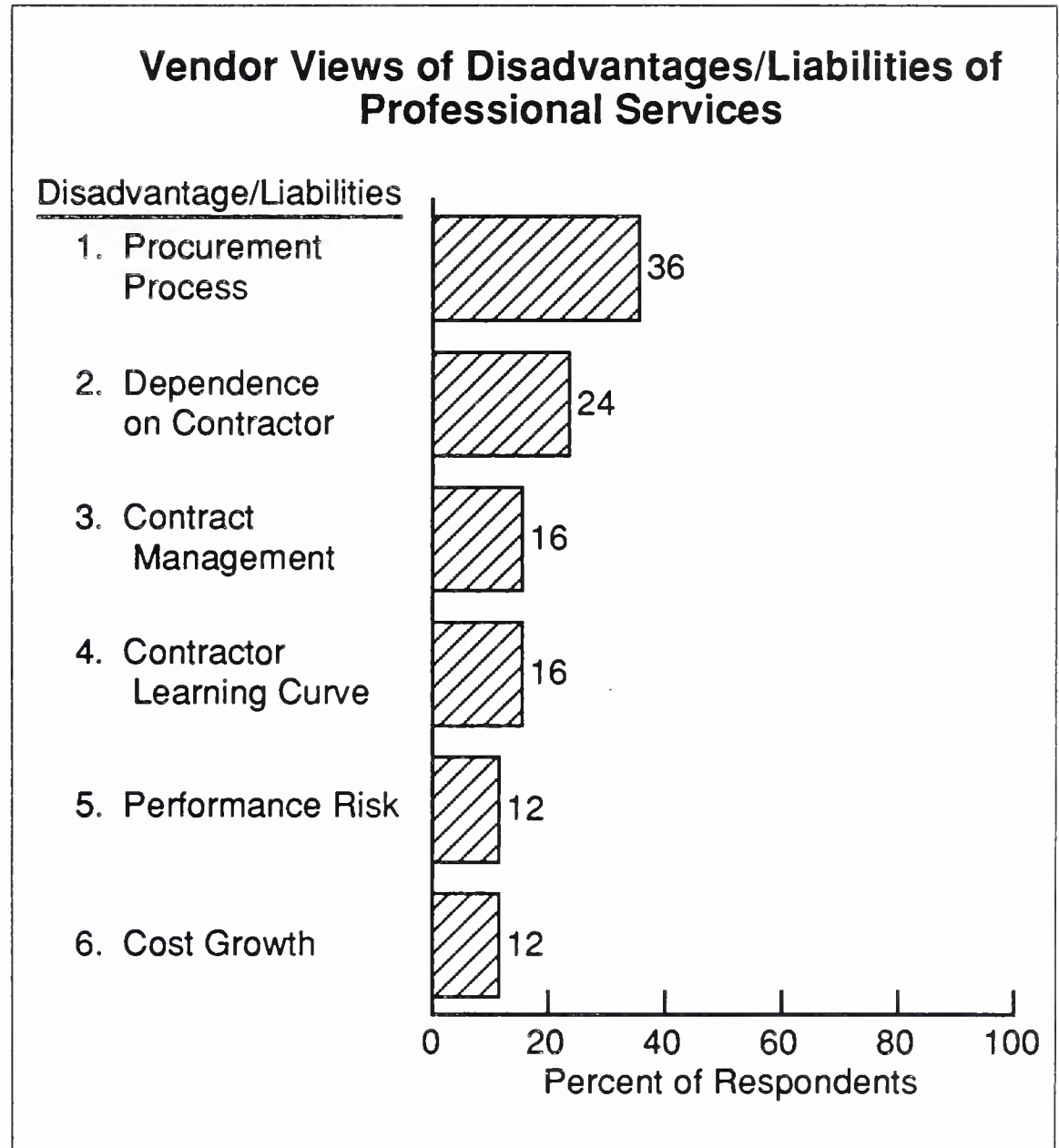


- The ability to balance workloads and augment in-house government staffs during peak workload times was considered an advantage because the government can start or stop work without any dislocation of in-house personnel. An added cost benefit is that reduction-in-force (RIF) costs are avoided.
- Expedience, or a means of getting work done faster without the inherent administrative problems of shifting personnel to perform the work in-house, was considered another significant advantage. Several vendors believed that there is less hassle and fewer problems associated with ADP if the work is performed by a professional services contractor.
- Some vendors believed that contractor employees are more motivated to perform than government employees.

2. Disadvantages/Liabilities of Contracting

The vendor views of the disadvantages and liabilities of contracting for professional services shown in Exhibit V-6 are somewhat different than those expressed by government agencies, shown in Exhibit IV-9.

EXHIBIT V-6



- The major disadvantage identified by the vendors was associated with the actual procurement process. Vendors considered the government procurement process long and inflexible. They believed the government has a problem in evaluating quality versus price, and there is always the threat of a protest if the lowest-priced bidder does not win.

- Dependence on the contractor was considered another major liability. If contracting does not allow the government in-house staff to build its skills, then when the contractor leaves, the expertise leaves. And when contracts are recompeted, some loss in continuity can occur if the incumbent is replaced.
- Performance risk is another liability because the lack of government agency control over contractor personnel is a potential problem.
- Contract management was also viewed as a significant disadvantage. Some vendors stated that satisfying the complexities and legal obligations of a contract can pose serious problems through oversight or incorrect interpretation.

3. Satisfactorily/Poorly Performed Contracts

The factors that vendors believed affected the results of professional services contracts are illustrated in Exhibits V-7 and V-8. These project components were mentioned by vendors who contributed case studies for the 1990 update of this report.

EXHIBIT V-7

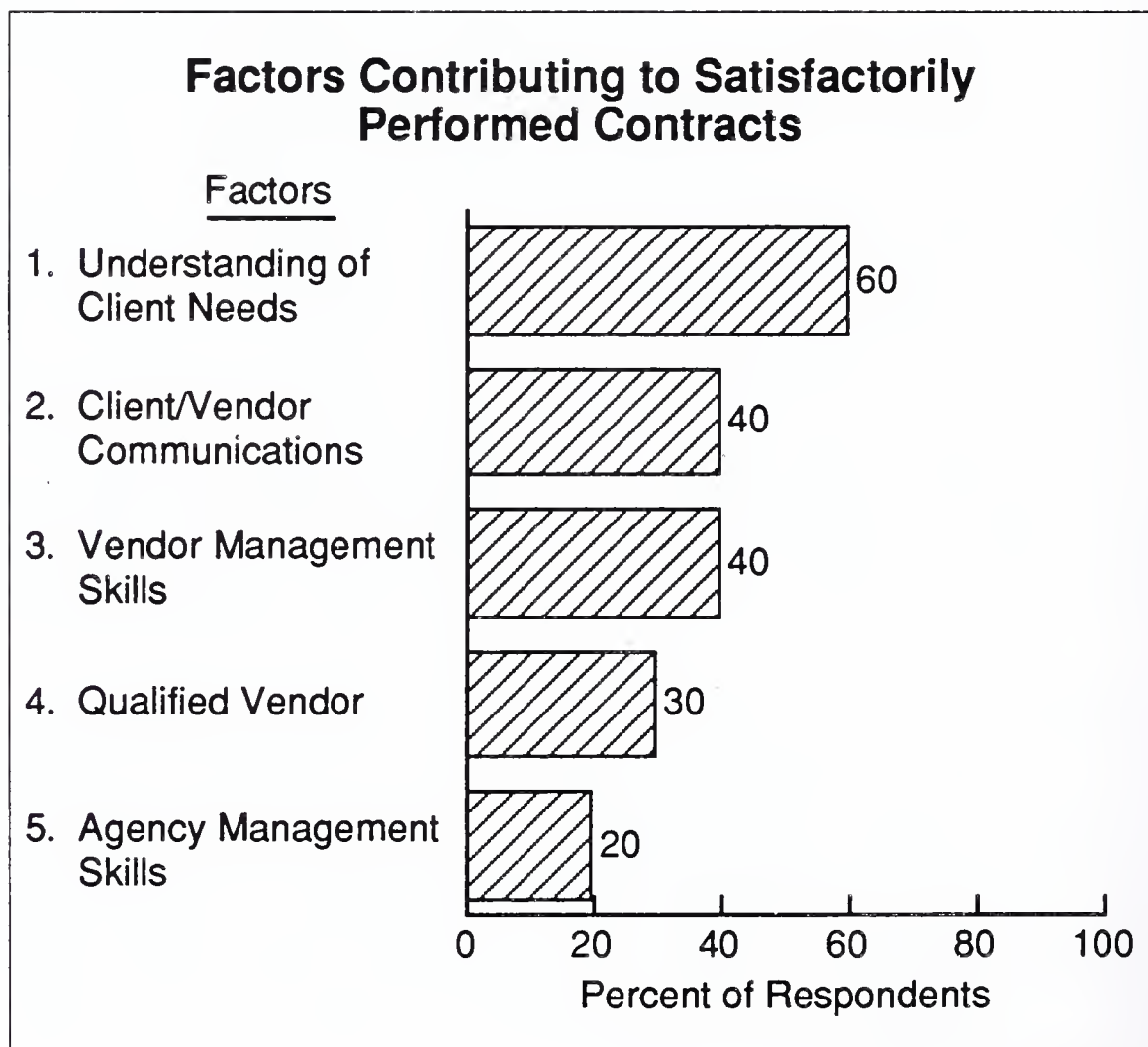
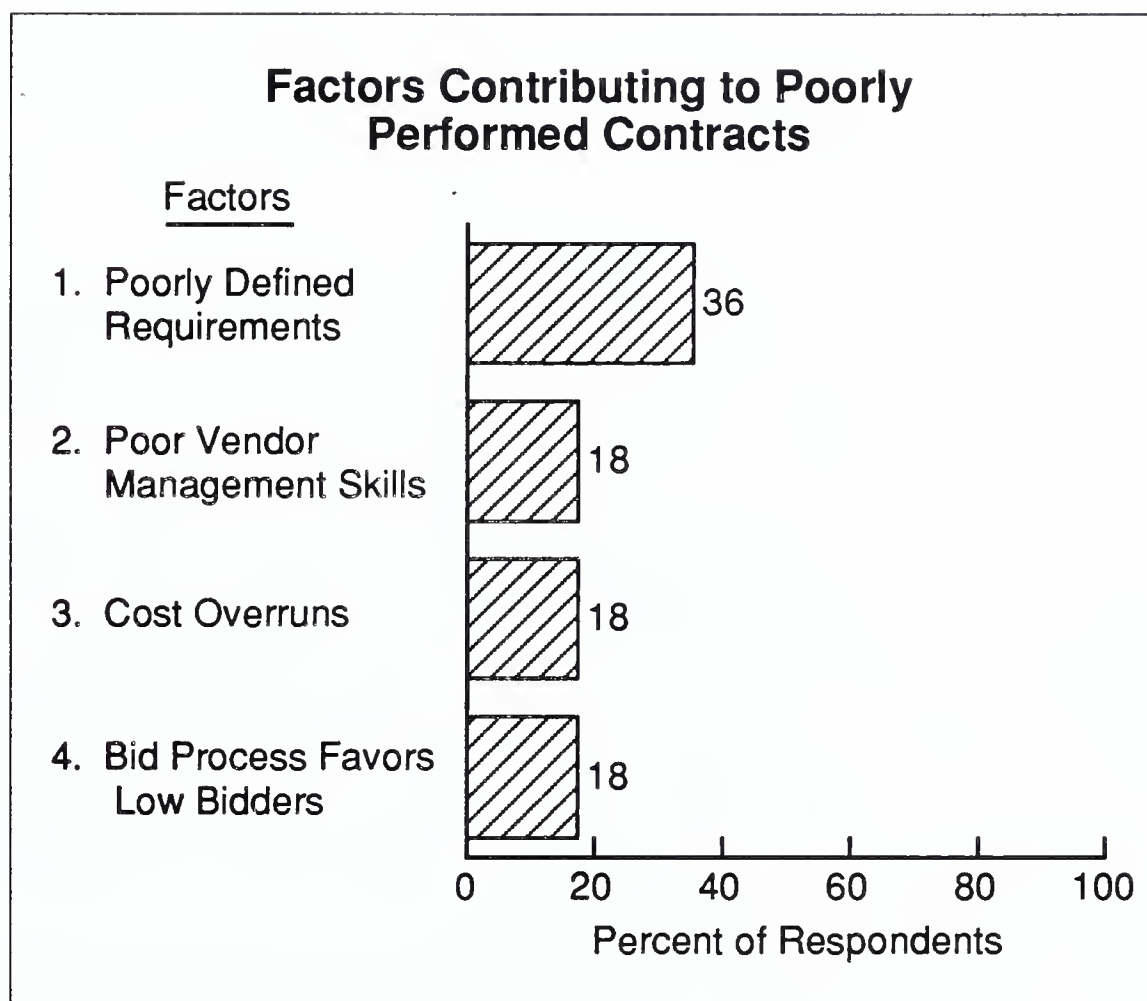


EXHIBIT V-8



a. Satisfactorily Performed Contracts

Vendors overwhelmingly stressed that the key to a satisfactorily performed professional services contract is an understanding of the client agency's needs. Well executed RFPs and task orders allow contractors to respond to agency expectations.

Another way agencies and vendors can help in achieving successful completed projects is to communicate with each other. Open lines of communication throughout a contract's life cycle create realistic attitudes, facilitate improved requirements understanding, and promote the vendor's image in the agency. Fresh and open discussions of systems alternatives contribute to a satisfactorily performed contract.

Just as poor vendor management skills can adversely affect a project, good skills obviously contribute to completing successful projects. Thorough work planning, progress review, project control, and qualified and stable contractor personnel are all necessary components of a satisfactorily completed contract. There should be sufficient contractual procedures, but they should not be overbearing.

If the agency is also technically knowledgeable and possesses good project management skills, it can play an active role in monitoring the contractor's performance to assure compliance to the project's requirements and schedule.

b. Poorly Performed Contracts

Professional services contractors are faced with the difficult problem of meeting agencies' expectations when an S.O.W. is incomplete or when an RFP does not specify explicit requirements. Poor specifications tend to ensure poor contractor performance.

If vendors possess poor staff and project management skills, they will have problems in achieving successful completion of professional services contracts. On the other hand, contracts that impose unrealistic administrative procedures and reporting requirements will also adversely affect completion of the contract. Contractors must strive to place personnel with strong track records in managing successful projects and junior staff members. A winning team needs to be assembled. Vendor project managers must be able to reduce attrition and also provide for additional staff training if necessary. An unqualified staff will undoubtedly result in a poorly performed contract.

When a contractor exceeds budget allocations for a project, the contracting agency may be displeased even if the project's technical specifications have been met.

Vendors also mentioned that the bidding process itself contributes to producing poorly performed contracts. The lower bid is usually the winning bid, which does not assure that the best-qualified staff will be performing the project.

4. Differences between Commercial and Federal Government Markets

Industry respondents in one of the earlier studies were asked to identify what they perceived to be the differences between the commercial markets and the federal market for professional services. These differences are presented in Exhibit V-9.

- Based on frequency of mention, the greater price sensitivity for acquiring services in the federal government was the most highly rated difference. Price is more of an issue in the federal market due to the bidding process, and also due to vendors supplying pricing information for GSA schedules. Price should not be the underlying determinant for awarding many types of professional services contracts. The second-most-noted

difference was the complexity of the acquisition process in the federal government, compared to the purchasing procedures followed in the commercial market. The federal acquisition process is often lengthy and involves adherence to numerous regulations.

EXHIBIT V-9

Government versus Commercial Market Differences

Market Differences		
Federal Market	Commercial Market	Rank*
Greater price sensitivity	Less price sensitivity	1
Complex acquisition process	Simpler purchasing procedures	2
Wider range of evaluation criteria	Narrower basis for award	3
Lengthy phased development cycle	Shorter-term evolution	4
Subject to greater legal and economic constraints	Less rigid legal and economic constraints	5

*Rank based on frequency of mention by respondents.

- Surprisingly, pressure on profits was not included in the survey results. Unlike commodity vendors (hardware and packaged software vendors and telecommunications service providers), professional services firms are selling the time of expert people. The competitive environment makes it difficult to pay proper salaries in some contracts and then provide the appropriate multiplier. A 1988 report cited a government contract in which engineers were receiving \$7.29/hour in wages and benefits. At that level, the government runs the risk of obtaining little or no usable support from the contractor.
- Another pressure on profits comes from cash flow, a particularly difficult problem in professional services contracts. Under DCAA rules, a government contractor may not bill out the interest expense associated with performing a contract. However, in many contracts, agencies withhold 10% to 20% of the incurred expenses until contract completion. If a contract runs more than a year and represents more than \$100,000 in billings, cash flow problems can arise. This may discourage some small vendors from bidding on otherwise excellent government opportunities.

5. Vendor Perceptions of Agency Opportunities

Professional service vendors differed as to which agencies they believed provide the most attractive opportunities. Some vendors have narrowed their federal government marketing to only the DoD agencies or selected civil agencies, while other vendors serve both.

Exhibit V-10 shows that 69% of the vendors conducted business with both the DoD and civil agencies. This percentage has increased since 1988 as more DoD vendors seek to expand their businesses to the civil side to offset declining defense spending. Frequent departmental targets include Treasury, NASA, Health and Human Services, Energy, and Transportation.

EXHIBIT V-10

Vendor Perception of Agency Opportunities for Professional Services

Agency Opportunities	Percentage
DoD and civil agencies	69
DoD agencies only	23
Civil agencies only	8

Over 20% of the respondents served only defense agencies. The smallest share of vendors concentrated their professional service business within the civil agencies.

In general, professional services vendors did not notice agencies favoring contractor assistance for specific types of applications development or customization. Vendors contributing to the 1990 report noted that agencies tended to seek contractor assistance when applications require a high level of technical expertise to develop. Only the applications areas of logistics and financial software were cited by a small percentage of respondents, as shown in Exhibit V-11.

EXHIBIT V-11

Application Types Contracted to Professional Services Vendors

Application Types	Percent of Responses*
No Norm	86
Logistics	14
Financial	14

* Percentages do not add to 100% due to multiple responses.

6. Satisfaction Level

Vendors were asked about their perceptions of government agencies' general level of satisfaction with the performance of professional services contractors. The results are presented in Exhibit V-12.

Vendors believed the federal government was reasonably satisfied with vendor responsiveness to agency needs and quantity and quality of work. However, the satisfaction levels themselves given by the vendors are not very high. For several factors—notably cost and delivery schedule—vendors considered the government satisfaction level rather low.

This represented a fundamental problem for professional services vendors. Many of the vendors surveyed offered the comment that there needs to be increased emphasis on holding down costs and on timely delivery of the products and services.

In contrast, however, the contractors that provided case study material for the 1990 report believed that agencies were extremely satisfied with the results of contractors' efforts on their projects. The case studies exemplified achievable tasks and the breadth of services provided by the contractors. (see Exhibit V-13).

EXHIBIT V-12

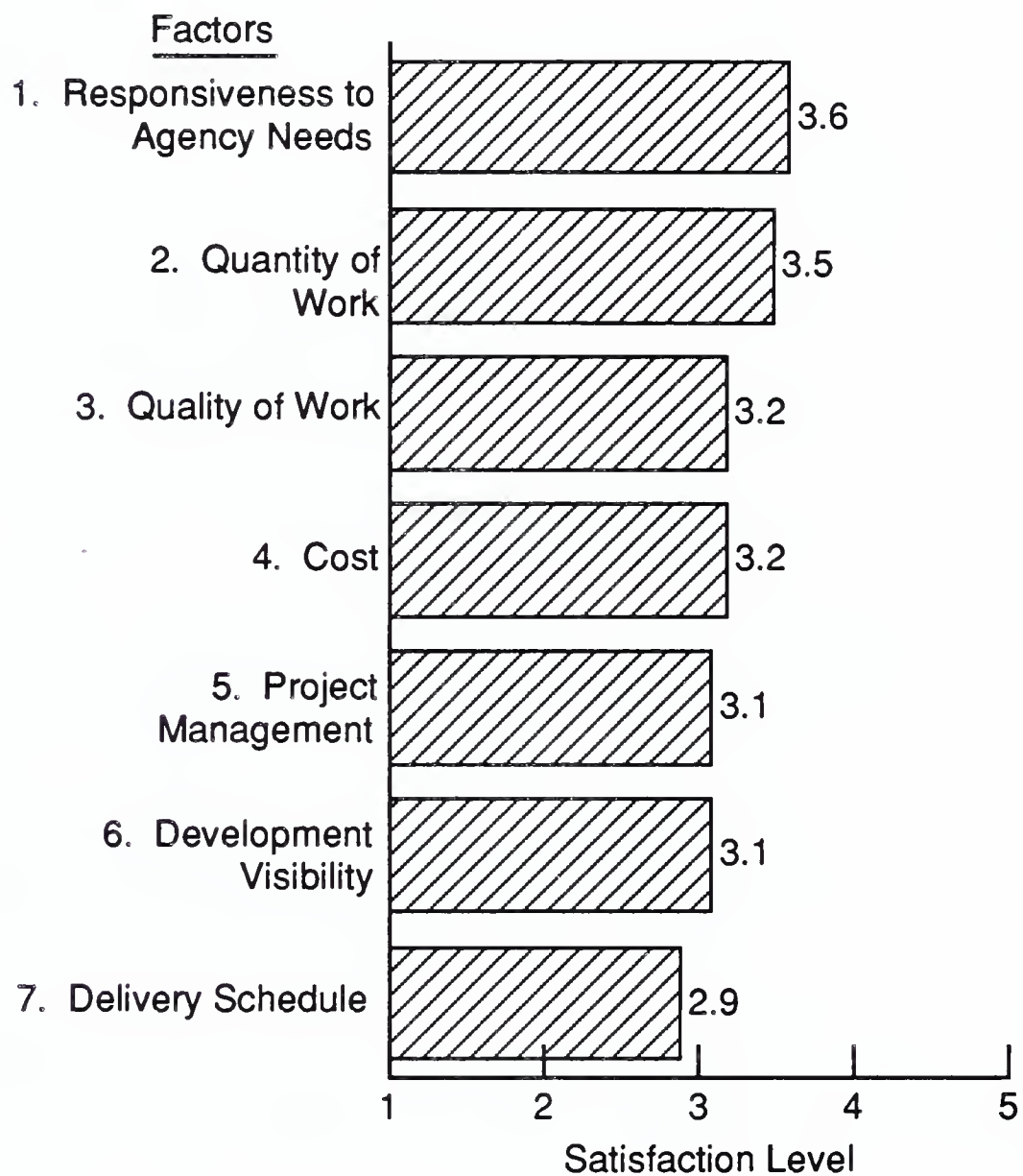
**Vendor Perception of Agency Satisfaction
with Professional Services Contractors**

EXHIBIT V-13

Vendor Perception of Agency Satisfaction with Case Study Examples

Rating (1-5)*	Percent of Respondents
5	58
4	33
3	8

* Rating based on 1-5 scale, where 5 = extremely satisfied and 1 = not satisfied at all.

C

Vendor Contracting Views

1. Available Contracting Vehicles

Vendors provide professional services to the government under a variety of contract types.

- Cost-plus contracts provide for vendor costs to be paid and a fee added that is either negotiated at the time of award (cost-plus-fixed-fee) or based upon the performance of the contractor in satisfying the contract requirements (cost-plus-award-fee). Cost-plus contracts regulate the margin of profit allowed, but clearly place the risk of overall cost with the government.
- Fixed-price contracts commit vendors to perform and complete a contract at a predetermined price ceiling. To a significant extent, the profitability associated with a fixed-price contract is dependent upon the vendor's ability to accurately appraise, in advance, the cost of providing services. Managing fixed-price contracts successfully requires an extremely well written and detailed statement of work and project scope. The risk of completion is placed on the vendor.
- Level of effort (LOE) or time and materials (T&M) contracts provide for a fixed-price hourly billing rate for the various labor categories to be applied to a contract plus reimbursement by the government for travel, supplies, equipment, and other materials required to satisfy the terms of the contract. The primary variable is the number of hours of each category to be used in performing assigned tasks. In many competitive situations, vendors are required to combine their contracts with a "not-to-exceed" clause that essentially imposes cost ceilings on the contract.

2. Preferred Contract Types

In earlier studies, vendors more clearly preferred a mixture of contract types in order to minimize their financial risks. However, as shown in Exhibit V-14, vendors indicated a stronger preference for fixed-price contracts.

Adhering to fixed-price contracts has several implications for vendors. Vendors have shifted their contract preferences because they expect to experience decreasing profit margins and therefore will need to more accurately assess their costs of doing business and trim operations where possible. Furthermore, vendors were of the opinion that the DoD was attempting to limit the profits made by contractors.

A number of vendors classified LOE and T&M contracts as fixed-price, since each hourly billing rate is fixed for the duration of the contract. As noted earlier, however, the federal government's general preference for overall lowest cost, or price, has led to a number of vendors offering bids with unpaid overtime or minimum wages for some technical levels.

EXHIBIT V-14

Vendor Preference for Contract Type for Professional Services

Preferred Contract Type	Percentages	
	Vendors	Agencies
Cost-plus/cost-plus incentive fee	23	36
Fixed-price	47	30
Mix	23	24
Other	7	10

The vendors were also evenly split in their preference for cost-plus and a mix of contracts. Vendors continue to prefer a mixture of types of contracts in order to minimize their financial risk. This particularly applies to programming and analysis contracts where the financial risks are substantial.

Industry respondents were also exploring opportunities to provide professional services to federal agencies under Multiple Award Schedule Basic Ordering Agreements. Fifty percent of all the respondents surveyed in the 1989 study were providing services under BOAs. Contracts mentioned included FEDSIM, GSA, Energy, and DoD.

Half of the respondents in the 1990 update felt that SETA contracts are the best contracting vehicles for acquiring professional services, as shown in Exhibit V-15. According to the vendors, the users cannot attain the technical proficiency or the experience in various technical areas that a systems engineering firm can. SETA contracting is appropriate for those contracts with loosely defined requirements—it's a more flexible vehicle for the agency and for the contractor. It can also be a poor vehicle because it limits access to specialized workers that may be required for high-level studies.

EXHIBIT V-15

Vendor Perception of SETA Contracting for Professional Services

Perception	Percent of Respondents	Reasons
Best contracting vehicle	50	Flexible
Poor contracting vehicle	25	No access to high-level skill sets
No Opinion	25	

3. Characteristics of a Successful Contractor

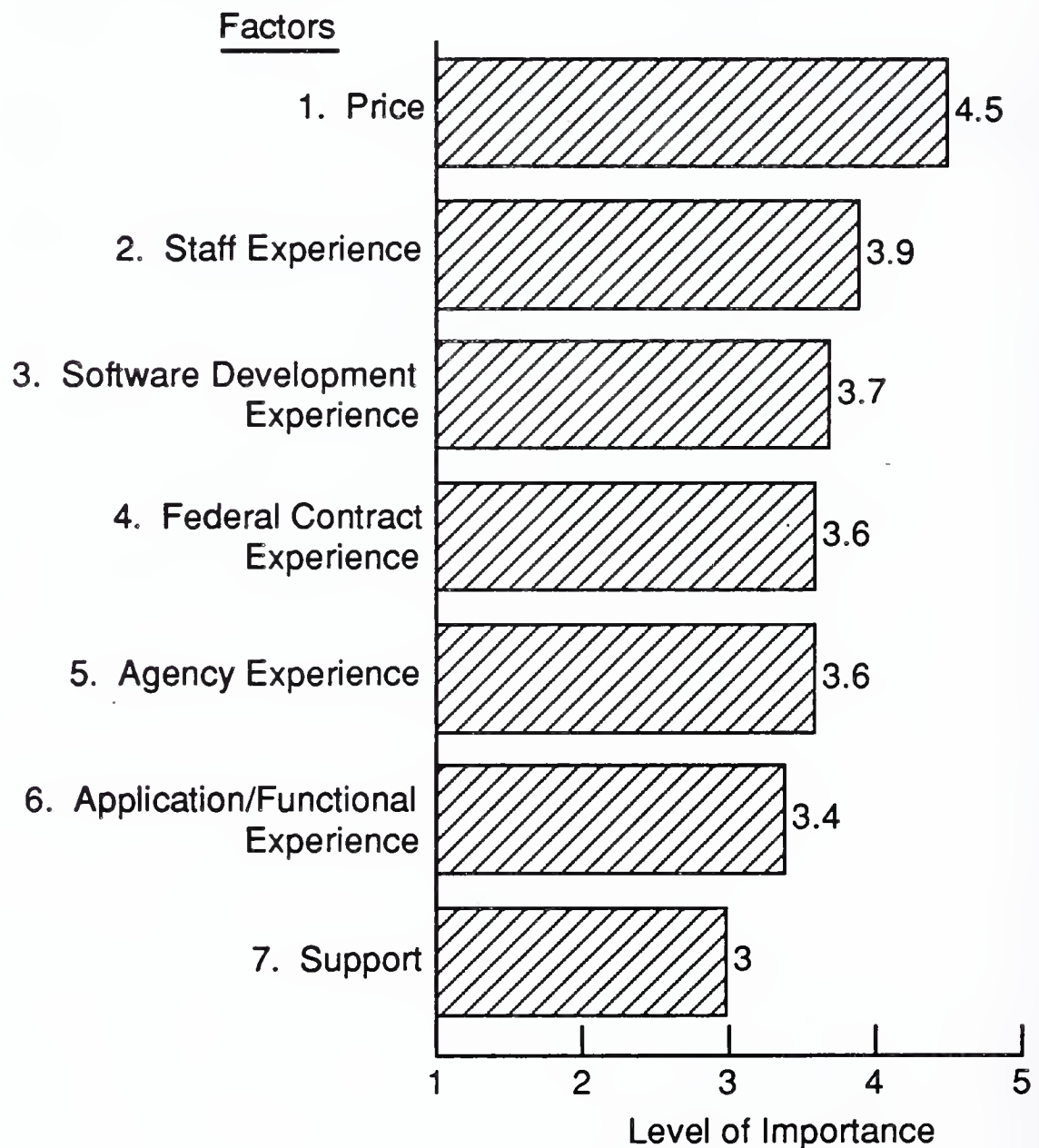
As shown in Exhibit V-16, vendors ranked price, staff experience, and software development experience as the three most important characteristics of a successful contractor.

Support and hardware experience were rated as the least important of all characteristics by the vendors. As previously noted, these characteristics were reported by government respondents as important in winning a bid. This incongruence needs to be addressed.

One reason for the divergence of opinion was that agency respondents were looking at the situation after the bid had been awarded, whereas contractor respondents were primarily oriented toward getting the business rather than operating the contract. However, vendors should emphasize their support capabilities and experience in their bids. Unfortunately, it is INPUT's experience that most professional services vendors cannot provide evidence of customer satisfaction since they do not carry out systematic surveys in this area. INPUT's own surveys often return unexpected results, especially in highly focused areas.

EXHIBIT V-16

Vendor Perception of the Relative Importance of Vendor Characteristics to Federal Agencies



4. Perception of Most Attractive Product or Service

Vendors were asked which of their company's professional services or product capabilities they thought agencies found most attractive. The responses ranged from the specific categories of professional services under study in this report to other products or services related to the vendors' areas of expertise (see Exhibit V-17).

EXHIBIT V-17

Vendor Ranking of Attractive Products and Services to Government Agencies

Products/Services	Rank*
Software development	1
Consulting	2
Project management	3
Financial systems	4
Support	5

*Rank based on frequency of mention by respondents.

Vendors believed that software development was most attractive because:

- Most agencies are reluctant to use prepackaged solutions—a situation that now is significantly changing in response to congressional and budget pressures.
- Qualified in-house technical staff are always in short supply.

The presence of financial systems is interesting, possibly reflecting the growing interest in standardization being promulgated by the Joint Financial Management Improvement Program. This item, which is an application area, does not fit with the other four, which are functional areas. For example, a financial systems contract could involve software development, consulting, project management, or support.

5. Selection Criteria

Vendors need to better understand and respond to the criteria used by the government in selecting a vendor for professional services. As shown in Exhibit V-18, vendor respondents considered the proposed technical solution the number-one selection criterion.

As noted in Exhibit IV-13, an earlier survey of agencies did not concur with the vendor perceptions, except in the area of the proposed technical solution. Many vendors noted, however, that the technical solution is usually the entrance ticket to a price, not a cost, "shoot-out" where either the preferred or lowest-priced vendor wins.

EXHIBIT V-18

Vendor Perception of the Importance of Contractor Selection Criteria to Federal Agencies

Selection Criteria	Ranking*	
	Vendor	Agency
Proposed technical solution	1	1
Cost	2	4
Vendor reputation	3	2
Project management	4	5
Staff experience	5	3

*Rank based on frequency of mention by respondents.

D

Trends

1. Increases/Decreases in Professional Services

A majority of the vendors surveyed predicted an increase in the amount of professional services work with the government over the next two to five years, as shown in Exhibit V-19.

At the time vendors were surveyed, the majority did not view the government's increased use of packaged software as hindering the professional services market. The respondents were of the opinion that ample opportunities for modification, installation, and training by professional services vendors would continue. Furthermore, vendors commented that the federal agencies did not have the necessary in-house expertise to perform many of the software-related services. In reality, 1990 was the best year for all three categories of professional services. However, in 1991, expenditures declined. Estimates for 1992 place education and training at 1988 levels, with design and consulting experiencing a minor increase over 1991. Software development is the only category expected to show growth in 1992.

EXHIBIT V-19

Vendor-Expected Change in Contracting for Professional Services

Professional Services Category	Percent of Respondents			Average Change* (Percent)
	Expected Increase	Expected Decrease	No Change	
Consulting services	46	8	46	30
Education and training	31	-	69	7
Software development	38	8	54	30

*Change over the next five years, GFY 1988-1992.

Negative changes in the federal budget and pressures to retain in-house staffs over the past few years caused this market to decline after 1990. Cutbacks in the number of new programs, especially in Defense, and in other programs planned for enhancement have significantly hurt this market.

In the 1988 study, industry respondents were also asked their opinions on whether the government would increase its procurement of System Engineering/Technical Assistance (SETA). Eighty-four percent of the respondents felt that the government would increase its contracting for SETA due to the lack of federal personnel to accomplish these tasks. Vendors noted that some of the SETA awards may become part of other larger contracts at agencies.

2. Factors Affecting Government Spending

Vendors surveyed by INPUT suggested numerous factors that could increase or decrease federal government spending on professional services in the next five years. INPUT grouped these factors into the four categories presented in Exhibit V-20.

EXHIBIT V-20

Ranking of Factors Affecting Future Government Spending for Professional Services

Factor	Rank*	Positive or Negative Effect
Budget changes (authorization, appropriation, apportionment)	1	Negative
Government personnel availability	2	Positive
Regulatory policy changes	3	Positive
Price	4	Negative

*Rank based on frequency of mention by respondents.

- The most frequently mentioned factor was the effect of budget cuts and changes in authorization and appropriations on professional services spending.
- The availability of government personnel was also considered an important factor. Included in this is not only the shortage resulting from congressionally imposed limits on agency staffing, but also the lack of sufficient numbers of specialists and managers in newer IRM technology within the government. Due to a lack of experienced personnel, agencies will be forced to seek the services of vendors.
- Regulatory policy changes, in particular OMB A-76 and OMB A-130, were considered important influences. Circular A-76 recommends the use of the private sector by federal agencies for services, and A-130 agency guidelines create more opportunities for professional services vendors.
- The cost of acquiring professional services was mentioned as a possible negative factor affecting future use of services by agencies. The more expensive a product or service is, the less likely it will be purchased.

Vendors would probably voice opposing views on the effects of CIM on the professional services market if interviewed for the 1991 update of this report. Consolidation of functions across DoD agencies will stop many individual agency plans, but will place increased demands on agencies that provide specific IS functions. Agencies that will supply services will tend to require more professional services from vendors than agencies that are the recipients of services.

3. Industry Trends Affecting Vendor Revenue

The factors that vendors believed impacted their professional services revenues were numerous and varied. The responses are listed in order of frequency mentioned, in Exhibit V-21.

EXHIBIT V-21

Ranking of Industry Trends Affecting Revenue in the Federal Market

Industry Trends	Rank*
New technology	1
Industry standardization efforts	2
Increased competition due to CICA	3
Consolidation of contracts	4

*Rank based on frequency of mention by respondents.

- Federal agencies are demanding the benefits of new technology in hardware, software, languages, and associated peripherals. Outside services are needed to allow agencies to be more efficient in their use of new technological products.

The impact of changing technology on vendors of professional services was explored further in the 1989 update (see Exhibit V-22). Vendors are continually forced to acquire additional technological expertise to keep up to date with new hardware and software products. They must be more flexible and offer a myriad of technical solutions to clients problems. The availability of enhanced programmer tools and "revisable software solutions" increases programmer productivity and reduces the associated costs to the government. The impact is seen in actual costs, not in how vendors interface with agencies.

- Professional services opportunities were expected to increase due to emerging federal standards. GOSIP-compliant systems that allow interconnectivity and interoperability are now demanded by all federal agencies. Outside contractors will be sought to provide assistance in designing new systems, and connecting existing systems in adherence to this new federal standard.

EXHIBIT V-22

Impact of Technology on Professional Services Vendors

Impact	Percent of Responses
Acquire more technical expertise	57
Increase responsiveness	43
Increase programmer productivity	14
Impacts cost	14

Note: Multiple responses allowed

- The Competition In Contracting Act (CICA) was designed to bring fair and open competition to the contract award process. Opening the market to a greater number of vendors was believed by the respondents to be a major force shaping their future revenues. It prevents sole-source awards, and presents more opportunities for vendors. Several vendors noted that some new entrants appear to be niche players.
- Respondents expressed concern over the increase in the number of consolidated contracts by agencies. By creating an easier procurement process for agencies to secure services, the federal government has decreased the number of different opportunities for contractors and fostered more intense competition among vendors.

4. Technology Trends

In an earlier study, 67% of the vendors were qualified in Ada, as shown in Exhibit V-23. These same vendors did not report having a great deal of contract work that required the use of this Ada expertise. Another 19% reported that they are planning to become qualified in Ada when it is required in order to acquire contracts for professional services work.

EXHIBIT V-23

Current and Planned Vendor Qualification in Ada

Status	Percent of Respondents
Vendors currently qualified in Ada	67
Vendors planning to become qualified	19
Vendors with no current plans for Ada	14
Total	100

Industry representatives were also asked to identify technological factors that would alter the federal government's spending for professional services. The most frequently named factors are listed in Exhibit V-24.

- The increase in optical disk storage system capabilities was most frequently cited by the vendors as having a strong impact on future professional services acquisitions. This trend is expected to continue as more agencies look to image technology to solve agency efficiency problems.
- Artificial intelligence is gaining in use in tactical situations, automated planning, and support applications throughout the DoD. Large-scale information processing is the principal area of applications for AI as it is developing in civil agencies.
- Standards are being established through a consensus of federal regulatory and standards organizations, industry organizations such as ANSI and IEEE, and the vendor community. Progress toward development of OSI standards is being realized through the recent cooperation of U.S. industry and governmental efforts. Adherence to GOSIP standards was also mandated by OMB throughout the federal government. Federal compliance with GOSIP will help to aggregate the market and establish consistency among commercial products. Many RFPs are now specifying GOSIP compliance.

Exhibit V-24

Vendor Ranking of Technological Factors Affecting Future Government Spending for Professional Services

Factor	Rank*
Increase in optical disk storage capabilities	1
Developments in artificial intelligence	2
Standardization efforts	3
Developments in interface capabilities	4
Increase in use of supercomputers	5
Telecommunications developments	6
Increased use of fiber optics	7

*Rank based on frequency of mention by respondents.

Vendors should resign themselves to the fact that, though program managers may prefer incentive contracts, most contracting officers prefer to do business on a fixed-price basis. Vendors need to find, and put into practice, methods of pricing and managing professional services contracts that allow them to minimize the risk of poor performance on a fixed-price basis, or they will not be able to compete successfully in the government marketplace. To minimize costs and remain competitive, vendors need to make maximum use of automated tools to increase their productivity. The list below addresses this recommendation and those that follow.

- Maximize pricing strategies
- Comply with federal standards
- Vertically penetrate agency customers
- Maintain positive reputation
- Direct marketing efforts to reflect political emphasis on programs
- Capitalize on specialized expertise
- Promote best value bids

Given current defense consolidation and standardization requirements, professional services that stress standards or interoperability will likely fare well. For example, at this writing only three companies—AMS, CDSI, and KPMG Peat Marwick—offer financial software packages that comply with JFMIP Core requirements. These companies are obtaining significant professional services business in connection with these packages.

Vendors should vertically penetrate potential agency customers to better understand the agency mission and functions and to solve the agency problems, not modify the problem to meet an available solution. Much can be accomplished by stressing the benefits to the customer, rather than the benefits of the service. Although this appears to contradict some earlier stated agency opinions, the need to empathize with agency customers is frequently seen as desirable.

Vendors should also be aware that, especially in the civil agencies, their reputation is an important factor in winning work with an agency. The government is a small community, and a questionable reputation with one agency can impede getting work in another. Overcoming a poor reference can take a long time. It is extremely important that vendors regularly and systematically survey their agency customers to determine problems, satisfaction levels, trends, and opportunities. This should not be done through the field staff but by a central organization. In at least part of the survey, an independent third party should be employed to prevent biases and provide objective standards.

Vendors can make more effective use of their marketing budget if they emphasize their marketing in areas that are politically popular. In election years, Congress reacts to programs that gain or hold votes. In presidential election years, budgets are more likely to emphasize domestic issues than technology or defense.

Traditionally, agencies award contracts based on the lowest price offered. Vendors can try to reverse this trend by encouraging agencies to employ the best value concept when performing bid evaluations. The Yockey memorandum recently issued by the DoD encourages this practice. If agencies place more value on bid technical scores than on price, vendors will not find it necessary to cut profit margins to win contracts.



Professional Services Opportunities

Funding for professional services is provided in several budget categories of federal government agencies.

- Both support and direct investigation may be funded by research and development (R&D) elements.
 - Direct investigation may be identified in the R & D program descriptions.
 - Support services may be included in a general support budget element.
- Professional services acquired through procurement funding may be separately identified or included in an overall information system acquisition.

Most medium and smaller professional services projects and tasks, valued at less than \$2 million, are rarely identified in agency budget documents, unless specifically related to an information technology R&D project.

New professional services opportunities that are larger than \$1-2 million are listed in at least one of the following federal government documents:

- OMB/GSA Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11
- Agency long-range information resource plans developed in response to reporting requirements of the Paperwork Reduction Act of 1980, as amended
- Agency annual operating budget requests submitted to both congressional oversight and appropriations committees based on the OMB A-11 information

- OMB Circular A-76 agency support services review schedules for conduct of cost comparisons on a site-by-site, year-by-year basis
- *Commerce Business Daily* for specific professional service opportunities, for qualifications as a bidder, and for obtaining a copy of the RFP or RFC
- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies. Segments usually available include the R-1 (RDT&E Budget Request) and the P-1 (Procurement Budget Request), and classified program documentation available to qualified DoD contractors.

The programs identified in this report are typical of this market, but the list is not all-inclusive.

- Professional services is the largest market segment of the federal government and is expected to remain so in the near future.
- Most professional services contracts are multiyear, employing options or contract modifications to remain in force for a given vendor.
- With only a few exceptions, most services contracts are limited to three to five years in duration and require that the services be recompeted periodically.

The list of opportunities becomes smaller after FY 1992 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Reports will include additional programs and detailed program information for FY 1992 to FY 1996.

All funding proposals are based on cost data of the year submitted—with inflation factors dictated by the Administration as part of its policy—and are subject to revision, reduction, or spreading to future years in response to congressional direction. Additional reductions are likely in FY 1991 and beyond due to the deficit reduction constraints of the Gramm-Rudman-Hollings Act or direct congressional action.

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
<i>Air Force</i>			
System Engineering Support for Norad Computer System	V-1-30	1/1/92	5.0
Consolidated Space Operations Center Integration and Activation Support Contract	V-1-53	8/91 (Draft)	Unk
Special Operations Forces Planning and Rehearsal System	V-1-105	12/10/91 (est.)	Unk
Air Force CALS	V-1-108	Various	45.0
Lauch Support Services Contract	V-1-133	1/92 (est.)	50.0
Continuous Engineering and Technical Services	V-1-134	2-3/92	103.0
SETA for Flight Test Center	V-1-137	7/1/92	40.0
Test Range Support	V-1-138	12/16/91	325.0
Integrated Computer Aided Software Engineering	V-1-145	12/91 (Draft) 2/92 (Final)	Unk
Information Systems Engineering Prototype Development	V-1-149	1/92	500.0
Redesign and Implementa- tion of the Cadet Administration Management Information System	V-1-151	1/1/92	Unk

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
Defense Management Review 924	V-1-154	2/1/92	150.6
Systems Engineering Technical Assistance	V-1-157	1/1/92	39.0
<i>Army</i>			
Joint Computer Aided Logistics Services	V-2-35	Various	250.0
Acquisition Information Management Program	V-2-39	6/1/92	Unk
Sustaining Baseline Information Services	V-2-43	Various	500.0
Installation Support Modules	V-2-45	Unk	Unk
Common Hardware/Soft- ware II	V-2-51	2-3/92 (est.)	2,000.0
Information Systems Soft- ware Center - Technical Support	V-2-54	FY95	116.0
ADP Systems Services and Installation of Applications System Software	V-2-61	1/1/92	48.0
ADP Services	V-2-62	1/3/92	Unk
Combined Allied Defense Effort	V-2-64	FY93	46.0 (est.)
Missile Command Information Mission Area Support Services	V-2-66	10/18/91 (Draft) Unk (Final)	Unk

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
<i>Navy</i>			
Enhanced Naval Warfare Gaming Hardware and Software Maintenance	V-3-66	1/1/92	14.0
Navy WAM	V-3-83	Various	56.0
Navy Super Mini- computer Acquisition	V-3-91	7/9/91 (Open)	1,000.0
Remote Terminal System Replacement	V-3-93	1/1/92	150.0
Production Management Information System	V-3-101	Unk	38.2
Information Engineering II	V-3-104	Unk	Unk
Shipboard Non-Tactical ADP Program (SNAP I follow on)	V-3-113	1/3/92 (est.)	75.0
ADP Systems Develop- ment and Support Services	V-3-118	FY93	32.0
NARDAC Support Services	V-3-126	10/1/94	50.0
<i>Marine Corps</i>			
Systems Engineering Software Support Services	V-3A-12	10/1/94	12.0
Maintenance and Support	V-3A-13	1/1/92	Unk

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
<i>Other Defense</i>			
Defense Enrollment Eligibility Reporting System	V-4E-2	1/1/92	31.0
Joint WAM	V-4G-2	Various	178.6
National Emergency Telecommunications Service	V-4G-3	1/1/92	Unk
Corporate Information Management	V-4G-10	Various	Unk
SETA for US Transporta- tion Command	V-4G-12	10/1/92	9.0
Recompetition of the 21 Victor Program	V-4H-5	FY94	50.0
Defense Commissary Information Program	V-4K-1	1/2/92	50.0
<i>Agriculture</i>			
Project 615	VI-5-30	Late 1991	112.5
Integrated Systems Acquisition Program	VI-5-34	1/92	50.0
Systems Technology and Telecommunications Enhance- ment Program	VI-5-37	10/1/93	11.8
FCIC Office Automation	VI-5-39	1/1/92	9.3
<i>Commerce</i>			
Patent Application Management System	VI-6-36	2/92	1.0

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
ADP Engineering Support Services	VI-6-38	Unk	3.4
Systems Engineering and Technical Support Services	VI-6-40	12/91	15.0
SARSAT Software Development Recompetition	VI-6-42	1QFY93	13.5
Automated Trademark System	VI-6-43	1/92	45.4
CALS Support Services	VI-6-45	1/1/92	Unk
<i>Energy</i>			
Waste Information Network	VI-7-85	1/1/92	Unk
Licensing Support System	VI-7-87	12/93	200.0
Operations and Maintenance of ADP and Communications	VI-7-94	9/1/93	13.0
Technical Support Services	VI-7-98	12/91	Unk
ADP and Telecommuni- cations Support Services	VI-7-101	FY92	158.0
ADP Support Services	VI-7-102	1/1/93	22.0
<i>Health and Human Services</i>			
Earnings Modernization Project	VII-8-40	7/93	14.0

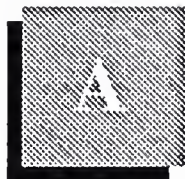
Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
Administrative and Scientific ADP Support Services	VII-8-41	1/1/93	13.0
IBM 370 Total Systems Recompetition	VII-8-49	FY97	880.0
<i>State</i>			
DOS Mainframe	VII-9C-2	1/92	200.0
Office Automation Recompetition	VII-9C-6	10/94	840.0
<i>Justice</i>			
FBI Field Office Information Management System	VII-10-2	10/1/93	182.9
Automated Litigation Support	VII-10-20	1/1/92	87.2
ADP Support Services	VII-10-28	FY93	26.6
Office Automation	VII-10-31	1/1/92	100.0
Office Automation	VII-10-32	10/1/92	202.8
ADP Support Services	VII-10-34	FY95	Unk
Non Immigrant Informa- tion System	VII-10-36	4/1/93	51.0
Litigation Support Services Recompetition	VII-10-40	10/1/92	Unk
Automated Litigation Support Recompetition	VII-10-41	10/1/93	270.0

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
<i>Transportation</i>			
Data Link Processor	VII-11-25	4QFY92	47.0
ADP Support Services Contract	VII-11-30	1/1/92	125.0
Mission Oriented Information Systems Engineering	VII-11-32	2/1/92	92.9
Recruit Information Management System	VII-11-35	10/1/92	.3
Personnel Management Information System/Joint Uniform Military Pay System	VII-11-40	FY93	5.6
Field Maintenance Support Contract	VII-11-43	Unk	Unk
Automated Documenta- tion Development and Maintenance System	VII-11-44	1/92	Unk
Multiple Contractor Resource BASE	VII-11-45	Various	Unk
SETA for the Capital Investment Plan	VII-11-52	11/19/91 (Draft)	Unk
National Airspace Implementation Support Contract	VII-11-53	6/92	Unk
<i>Treasury</i>			
Integrated Management System	VII-12-35	Unk	Unk

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
Automated Commercial System	VII-12-51	Various	18.0
Service Center Support System	VII-12-65	3/1/92	2,200.0
Document Processing System	VII-12-67	6/28/91 (Open)	650.0
Series E/EE Savings Bond System	VII-12-69	1/1/92	18.5
Software Development and Operational Support Services Recompensation	VII-12-71	10/1/92	Unk
<i>Education</i>			
Primary Accounting System	VII-13-11	1/1/92	1.4
Title IV Programs	VII-13-13	1/1/92	46.8
National Student Loan Data System	VII-13-14	9/1/92	13.9
Office Automation	VII-13-15	1/1/92	55.4
Campus-Based Processing Recompensation	VII-13-16	FY94	8.0
<i>General Services Administration</i>			
Contract Services Program	VIII-14-10	Various	1,193.7
Governmentwide Procurement Automation Program	VIII-14-19	10/1/93	Unk

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
FEDSIM Multiple Award Indefinite Quantity Contracts Recompensation	VIII-14-22	1/1/94	10.0
<i>NASA</i>			
Customer Data and Operations Systems	VIII-15-62	Unk	200.0
Engineering Analysis and Data System	VIII-15-71	6/19/91 (Open)	200.0
Advanced Tracking and Data Relay Satellite System	VIII-15-87	1/1/92	3,000.0
Scientific Computer Operations Programming and Analysis	VIII-15-90	8/1/92	27.0
Technical Support Services	VIII-15-93	10/1/93	12.5
Data Communications Support	VIII-15-94	FY93	45.0
White Sands Test Facility Support	VIII-15-95	10/1/92	170.0
Space Network Control Survey	VIII-15-96	1-2/92	Unk
Information Systems Contract	VIII-15-99	3/92	180.0
Engineering Support Services	VIII-15-100	1/92	26.4
Support to the Engineering Directorate	VIII-15-101	FY94	460.0

Agency/Program	PAR	RFP Schedule	Estimated Value or FY92-96 Funding (\$M)
Engineering and Technical Services in Support of the Office Flight Assurance	VIII-15-103	FY94	95.0
<i>Veterans Affairs</i>			
VBA Modernization Plan	VIII-16-11	1QFY92	220.0
<i>Environmental Protection Agency</i>			
Environmental Monitoring and Assessment Program	VIII-17-13	Unk	Unk
Data Management Support for Office of Pesticide Programs	VIII-17-16	FY93	1.5
<i>Federal Emergency Management Agency</i>			
Integrated Emergency Management Information System	VIII-18-7	Various	Unk
<i>National Archives</i>			
Records Administration Information System	VIII-32-3	FY92	Unk
<i>Executive Office of the President</i>			
Chief Financial Officers Act	VIII-33-1	Various	Unk
<i>Federal Communications Commission</i>			
Information System Modernization Project	VIII-34-1	1/92 (est.)	19.5



Professional Services Interview Profiles

A

Federal Agency Respondent Profile

Contacts with agencies were made both by telephone and through on-site visits.

1. Contact Summary

The distribution of job classifications among individual agency respondents for the 1987 and 1988 reports were as follows within DoD and civil agencies:

	Policy	Buyers	Users	Total
Civil	14	10	11	35
DoD	7	2	4	13
Total	21	12	15	48

2. List of Agencies Interviewed

Department of Agriculture

- Economic Management Service
- ASCS
- Soil Conservation Service

Department of Commerce

- International Trade Administration
- Office of Information Policy and Planning
- Office of Procurement Management
- Patent and Trademark Office

Department of Defense

- Air Force
 - Office of the Secretary
 - Military Airlift Command
 - Communications Group
 - Logistics Command

- Army
 - DARCOM
 - Civil Personnel Center
- Navy
 - Office of NALTOACS Program
 - Navy Medical Command
 - Space Command
- Defense Logistics Agency
- Office of the Secretary of Defense

Department of Education

- Office of Information Resources Management

Department of Energy

- Information Systems Division
- Office of ADP Services

Department of Health and Human Services

- Office of the Secretary
- Social Security Administration
- Public Health Service

Department of Housing and Urban Development

- Computer Services Group
- Office of Acquisition Management

Department of Interior

- Office of Information Resources Management
- Office of Management Analysis

Executive Office of the President

Department of Justice

- Drug Enforcement Agency
- Federal Bureau of Investigation

Department of Labor

- Office of Information Resources Management

Department of Transportation

- Office of Information Systems and Telecommunications Policy
- Federal Aviation Administration

Department of the Treasury

- Secret Service
- Office of Information Resources Management
- Internal Revenue Service
- Bureau of Public Debt

Environmental Protection Agency

- Office of Information Management

General Services Administration

- Office of Information Resources Management
- Office of Software Development and Office Technology (2)
- FEDSIM

National Aeronautics and Space Administration

- NASA Headquarters—Office of ADP Management
- Langley Research Center (2)

Securities and Exchange Commission**Veterans Administration**

B**Vendor Respondent Profile**

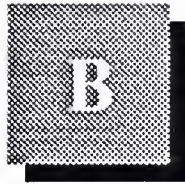
For the 1987 study, INPUT contacted a representative sample of contractors that provide professional services to the federal government.

Job classifications among individual vendor respondents included marketing as well as administrative executives.

Interviews with vendor personnel were conducted by telephone and by mail.

C**Case Study Respondent Profile**

Respondents that provided case study profiles on professional services projects included prime contractor representatives or agency program managers. For some projects, the prime contractor and the agency collaborated in supplying profile information.



Definitions

The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of information systems and services programs described in this report.

Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

The federal government's unique, non-technical terminology, associated with applications, documentation, budgets, authorization, and the procurement/acquisition process, is included in Appendix C, Glossary of Federal Acronyms.

A

Overall Definitions and Analytical Framework

Information Services - Computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes responsibility for the development of a custom solution to an information system problem (called *Systems Integration*)

- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, videotex, etc. (called *Network Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the *Information Services Industry* consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels, and competitive issues.

All *Information Services Market* forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers.

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- Processing Services
- Network Services
- Professional Services
- Applications Software Products
- Systems Software Products

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services.

- Turnkey Systems
- Systems Operations
- Systems Integration

Section B describes the delivery modes and their structure in more detail.

Outsourcing is defined as the contracting of information systems (IS) functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that IS management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources.

B

Industry Structure and Delivery Modes

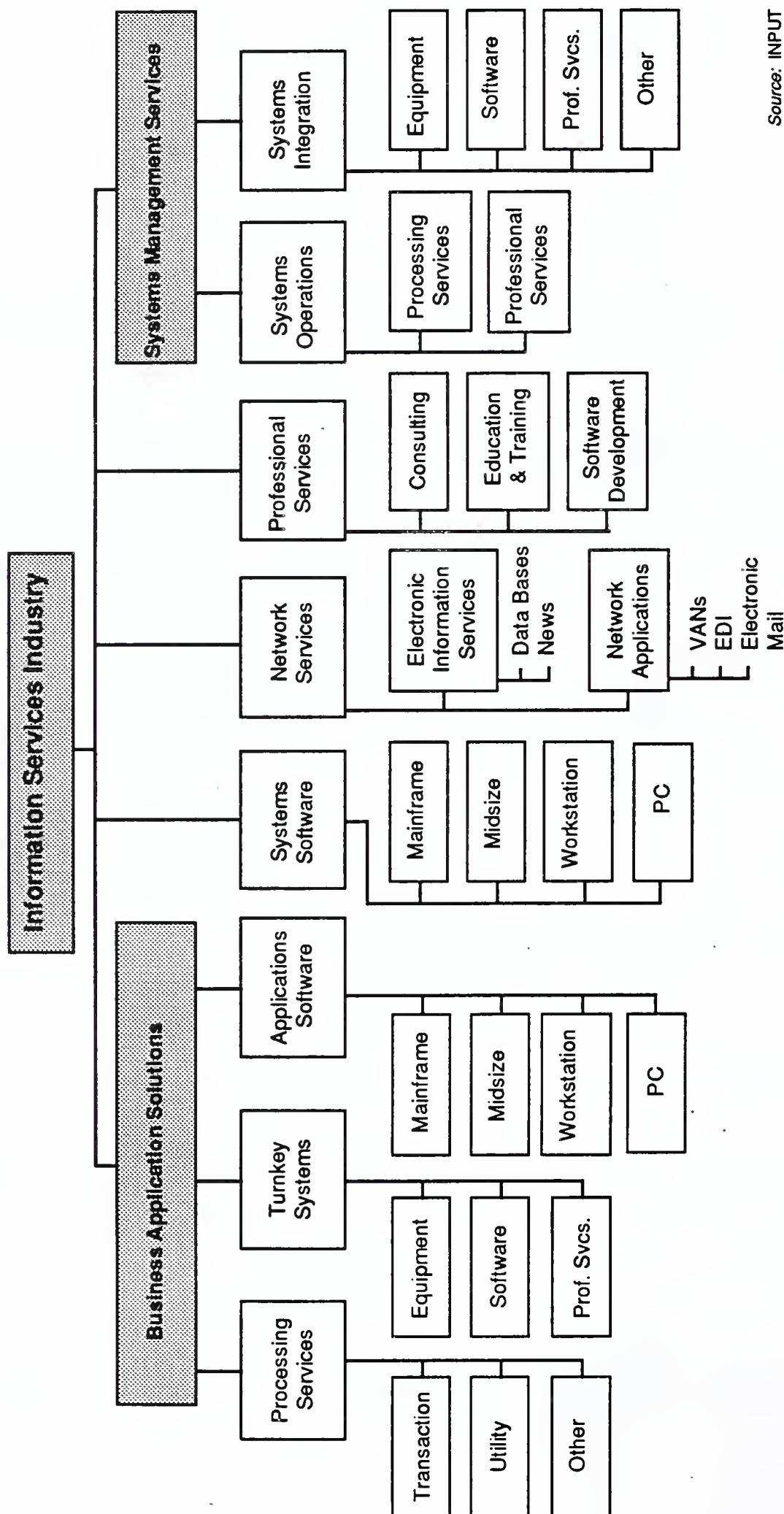
1. Services Categories

Exhibit B-1 presents the structure of the information services industry. Several of the delivery modes can be grouped into higher-level *Service Categories*, based on the kind of problem the user needs to solve. These categories are:

- *Business Application Solutions (BAS)* - prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., mortgage loan processing for a bank), cross-industry (e.g., payroll processing), or generic (e.g., utility time

EXHIBIT B-1

Information Services Industry Structure—1991



Source: INPUT

sharing). In general, BAS services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. The following delivery modes are included under BAS:

- Processing Services
- Applications Software Products
- Turnkey Systems
- *Systems Management Services (SMS)* - services which assist users in developing systems or operating/managing the information systems function. Two key elements of SMS are the customization of the service to each individual user and/or project, and the potential for the vendor to assume significant responsibility for management of at least a portion of the user's information systems function. The following delivery modes are included under SMS:
 - Systems Operations
 - Systems Integration

Each of the remaining three delivery modes represent a separate service category:

- Professional Services
- Network Services
- System Software Products

Note: These service categories are a new concept introduced in 1990. They are purely an aggregation of lower-level delivery mode data. They do not change the underlying delivery modes or industry structure.

2. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's site. Vendor-provided training or support in operation and user of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

Software products have several subcategories, as indicated below and shown in Exhibit B-2.

- **Systems Software Products**

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.
- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.
- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems, and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

- **Applications Software Products**

- *Industry-Specific Applications Software Products* - Software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical recordkeeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

EXHIBIT B-2

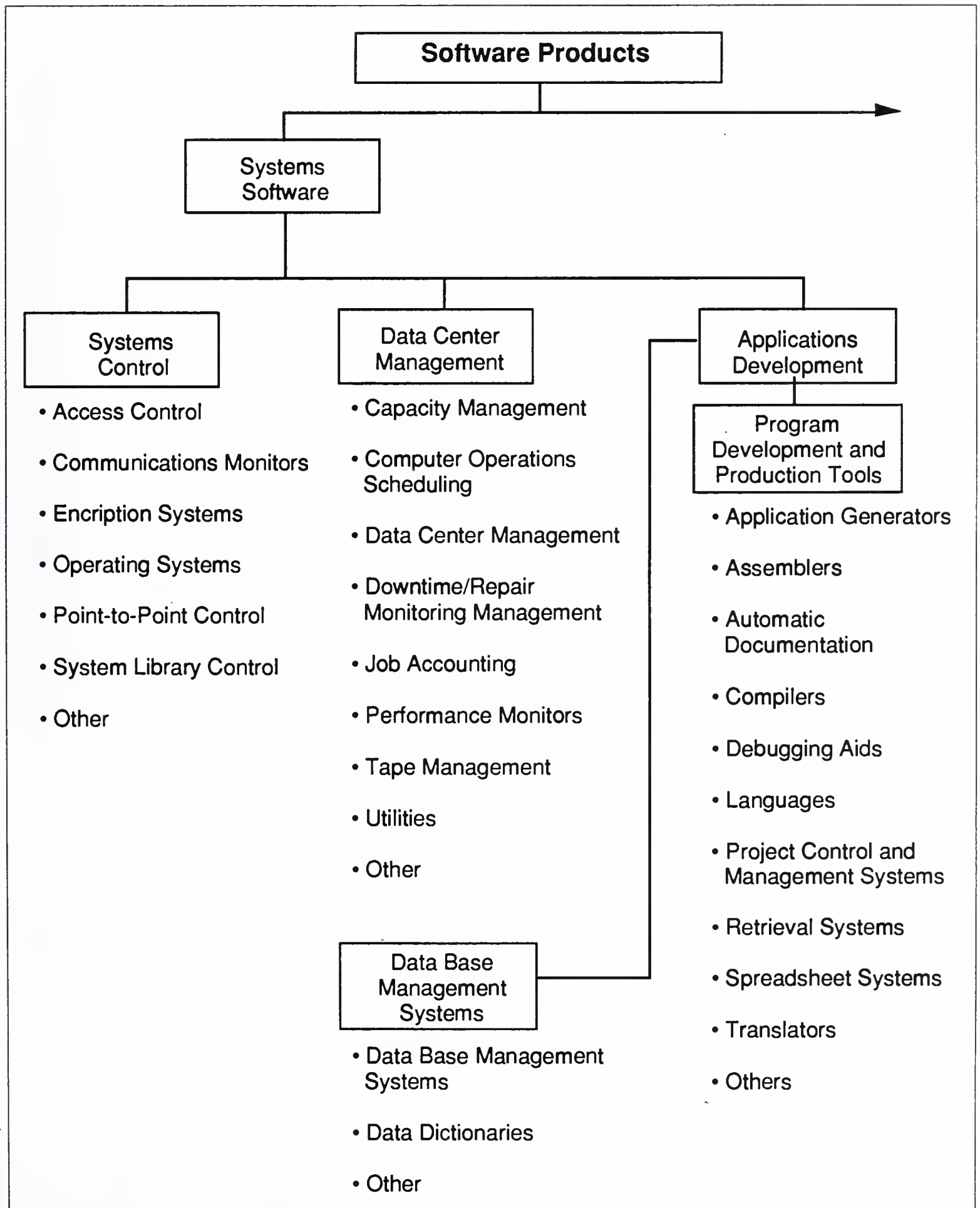
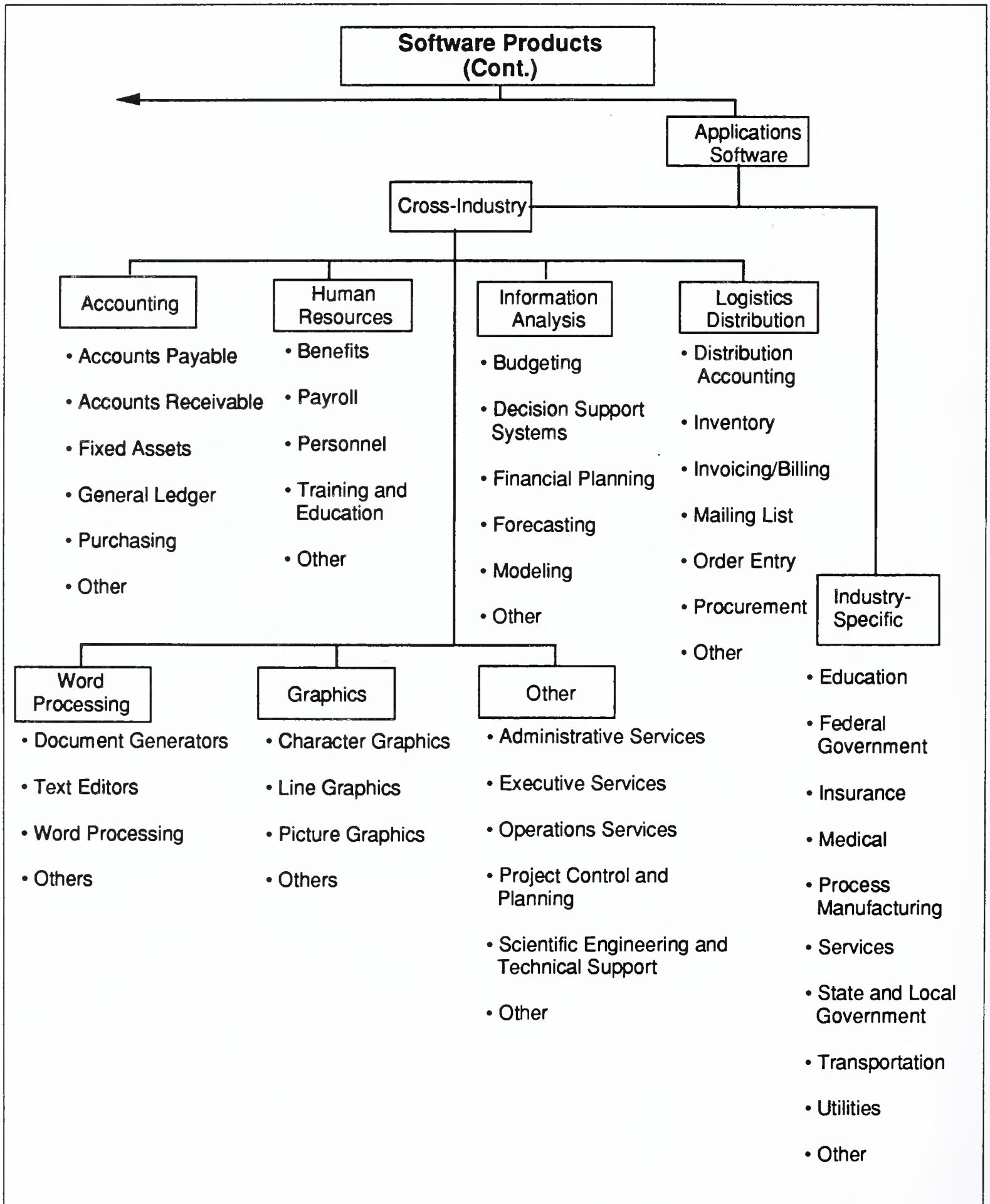


EXHIBIT B-2 (CONT.)



3. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computer and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- **Value-Added Reseller (VAR):** A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually application software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories:

- *Industry-Specific Systems* - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems.
- *Cross-Industry Systems* - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

4. Processing Services

This category includes transaction processing, utility processing, and other processing services.

- *Transaction Processing:* Client uses vendor-provided information systems—including hardware, software and/or data networks—at vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:

- *Interactive* - Characterized by the interaction of the users with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.
- *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.
- *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.
- *Carry-in Batch* - where users physically deliver work to a processing services vendor.
- *Utility Processing*: Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on vendor's system.
- *Other Processing Services*: Vendor provides services—usually at vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

5. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes:

- *Professional Services*: The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services delivery mode.
- *Processing Services*: The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services delivery mode.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management".

There are two general levels of systems operations:

- Platform/network operations - where the vendor operates the computer system and/or network without taking responsibility for the applications
- Application operations - where the vendor takes responsibility for the complete system, including equipment, associated telecommunications networks, and applications software.

Note: Systems Operations is a new delivery mode introduced in 1990.

6. Systems Integration (SI)

Systems integration is a business offering that provides a complete solution to an information system, networking or automation requirements through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization

- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
 - System documentation and user training
 - Systems operations during development
 - Systems maintenance
- Financing

7. Professional Services

This category includes consulting, education and training, and software development.

- *Consulting*: services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.
- *Education and Training*: Products and services related to information systems and services for the professional end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.
- *Software Development*: Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

8. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: Electronic Information Services, which involve selling information to the user, and Network Applications, which involve providing some form of enhanced transport service in support of a user's information processing needs.

- Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

- *Network Applications*
 - *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.
- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

C

Hardware/Hardware Systems

Hardware - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.
- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.
- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters
- *Communication Devices* - Includes modem, encryption equipment, special interfaces, and error control
- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

Terminals - Three types of terminals are described below:

- *User Programmable* - Also called intelligent terminals, including the following:
 - Single-station or standalone
 - Multistation, shared processor
 - Teleprinter
 - Remote batch
- *User Nonprogrammable*
 - Single-station
 - Multistation, shared processor
 - Teleprinter
- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications

Hardware Systems - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in various forms including:
 - Integrated circuit package
 - Plug-in boards with increased memory and peripheral circuits
 - Console including keyboard and interfacing connectors
 - Personal computer with at least one external storage device directly addressable by the CPU
 - An embedded computer which may take a number of shapes or configurations
- *Workstations* - High-performance, desktop, single-user computers employing (mostly) Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. Typical workstation products are provided by Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX) and IBM. These products usually cost more than \$15,000. However, at this writing many companies have recently announced sizable price cuts.

- *Midsize Systems* - Describe superminicomputers and the more traditional business minicomputers. Due to steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 32-bit to 64-bit word lengths at prices ranging from \$15,000 to \$350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and may go beneath the \$15,000 lower price limit. Typical midrange systems include IBM System/3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime Concurrent, Gould, Unisys, NCR, Bull, Harris, Tandem, Stratus, and many others.
- *Large Computer* - Presently centered on storage controllers, but likely to become bus-oriented and to consist of multiple processors or parallel processor. Intended for structured mathematical and signal processing and typically used with general purpose, Von Neumann-type processors for system control. This term usually refers to traditional mainframes and supercomputers.
- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general purpose computers, with capacities in the 100-500 million floating point operations per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-four gigabyte class, are labeled Class V to Class VII in agency long-range plans. Supercomputers fit in one of two categories:
 - Real Time - Generally used for signal processing in military applications
 - Non-Real Time - For scientific use in one of three configurations:
 - Parallel processors
 - Pipeline processor
 - Vector processor
 - *Supercomputer* - Is also applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by Von Neumann architectures.
- *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or

semipermanent interfaces. These systems may vary in capacity from microcomputers to parallel processor computer systems.

D

General Definitions

Analog - Signal or transmission type with continuous waveform representation.

ASCII - American National Standard Code for Information Interchange—Eight-bit code with seven data bits and one parity bit.

Asynchronous - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished by appending signal elements to the data.

Bandwidth - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

Baud - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

Byte - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

CBX - Computerized Branch Exchange—A PABX based on a computer system, implying programmability and usually voice and data capabilities.

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

Centrex - Central office telephone services that permit local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

Circuit Switching - A process that, usually on demand, connects two or more network stations, and permits exclusive circuit use until the connection is released; typical of the voice telephone network, where a circuit is established between the caller and the called party.

CO - Central Office—Local telco site for one or more exchanges.

CODEC - Coder/decoder—Equivalent to modem for digital devices.

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

Computer System - The combination of computing resources required to perform the designed functions. May include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

CPE - Customer Premises Equipment—DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

CSMA/CD - Carrier Sense Multiple Access/Collision Detect—Contention protocol used in local-area networks, typically with a multipoint configuration.

Current Dollars - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

Data Encryption Standard (DES) - Fifty-six-bit key, one-way encryption algorithm adopted by NIST in 1977, implemented through hardware ("S-boxes") or software. Designed by IBM with NSA guidance.

Datagram - A self-contained packet of information that does not depend on the contents of preceding or following packets and has a finite length.

DCA - IBM's Document Content Architecture—Protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

DCE - Data Circuit-terminating Equipment—Interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

DDCMP - Digital Data Communications Message Protocol—Data link protocol used in Digital Equipment Company's DECNET.

DECNET - Digital Equipment Company's network architecture.

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit.

DEMS - Digital Electronic Message Service—Nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally encoded information using the 10.6 GHz band.

DIA - IBM's Document Interchange Architecture—Protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

Digital - Signal or transmission type using discontinuous, discrete quantities to represent data.

DISOSS - IBM's DIStributed Office Support System—Office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's needs.

DTE - Data Terminal Equipment—Hardware which is a data source, link, or both, such as video display terminals that convert user information into data transmission, and reconvert data signals into user information.

EBCDIC - Extended Binary Coded Decimal Interchange Code—Eight-bit code typically used in IBM mainframe environments.

EFT - Electronic funds transfer.

Encryption - Electric, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

End User - One who is using a product or service to accomplish his or her own functions. The end user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

Engineering Change Notice (ECN) - Product improvements after production.

Engineering Change Order (ECO) - The follow-up to ECNs, including parts and a bill of materials to effect the change in the hardware.

Equipment Operators - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

Erasable Disk - A type of disk that allows users to erase data previously written. Erasable disks used for applications where data may need to be updated periodically.

Ethernet - Local-area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

Facsimile - Transmission and reception of graphic data, usually fixed images of documents, through scanning and conversion of a picture signal.

FDM - Frequency Division Multiplexing—A multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

FEP - Front-End Processor—Communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

Field Engineer (FE) - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Full-Duplex - Bi-directional communications, with simultaneous, two-way transmission.

General Purpose Computer System - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

Half-Duplex - Bi-directional communications, but only in one direction at a time.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

HDLC - High-level Data Link Control.

Hertz- Number of signal oscillations (cycles) per second, abbreviated Hz.

IBM Token Ring - IBM's local-area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies—IEEE 802.5-compatible.

IDN - Integrated Digital Network—Digital switching and transmission; part of the evolution to ISDN.

Independent Suppliers - Suppliers of machine room peripherals, though usually not suppliers of general purpose computer systems.

Information Processing - Data processing as a whole, including use of business and scientific computers.

Installed Base - Cumulative number or value (cost when new) of computers in use.

Interconnection - Physical linkage between devices on a network.

Interoperability - The capability to operate with other devices on a network. Different from interconnection, which merely guarantees a physical network interface.

ISDN - Integrated Services Digital Network—Completely digital, integrated voice and nonvoice public network service. Not clearly defined through any existing standards, although FCC and other federal agencies are developing CCITT recommendations.

Keypunch Operators - Individuals operating keypunch machines (similar to electric typewriters) to transcribe data from source materials onto punch cards.

Lease Line - Permanent connection between two network stations. Also known as dedicated or non-switched line.

Machine Repairers - Individuals who install and periodically service computer systems.

Machine Room Peripherals - Peripheral equipment generally located close to the central processing unit.

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more.

MAP - Manufacturing Automation Protocol—Seven-layer communications standard for factory environments promoted by General Motors/EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

Mean Time to Repair - The mean of elapsed times from the arrival of the field engineer on the user's site to the time when the device is repaired and returned to user service.

Mean Time to Respond - The mean of elapsed times from the user call for services and the arrival of the field engineer on the user's site.

Message - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

MMFS - Manufacturing Messaging Format Standard—Application-level protocol included within MAP.

Modem - A device that encodes information into electronically transmittable form (MODulator) and restores it to original analog form (DEMODulator).

NCP - Network Control Program—Software used in IBM 3705/3725 FEPs for control of SNA networks.

Node - Connection point of three or more independent transmission points which may provide switching or data collection.

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit.

On-Line - Pertaining to equipment or devices under direct control of the central processing unit.

Optical Disk - Storage device that uses laser technology to record data. Optical disks provide high storage capacity, but cannot be overwritten.

OSI - ISO reference model for Open Systems Interconnection—Seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

OSI Application Layer - Layer 7, providing end-user applications services for data processing.

OSI Data Link Layer - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

OSI Network Layer - Layer 3, providing call establishment and clearing control through the network nodes.

OSI Physical Layer - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

OSI Presentation Layer - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

OSI Session Layer - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

OSI Transport Layer - Layer 4, providing end-to-end terminal control signals such as acknowledgments.

Overseas - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

PABX - Private Automated Branch Exchange—Hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

PAD - Packet Assembler-Disassembler—A device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

PBX - Private Branch Exchange—Hardware that provides local circuit switching on the customer premise.

PCM - Pulse-Code Modulation—Modulation involving conversion of a waveform from analog to digital form through coding.

PDN - Public Data Network—A network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

Peripherals - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

PPM - Pulse Position Modulation.

Private Network - A network established and operated for one user or user organization.

Programmers - Persons mainly involved in designing, writing, and testing computer software programs

Protocols - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

Public Network - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

Read-Only - A type of disk that is prerecorded and can be used for retrieving data. A read-only disk cannot be overwritten. A read-only system will retrieve and display stored data, but the system cannot alter the stored data.

Read/Write - A type of disk that can be read and written upon. A read/write system will read and display stored data and alter data already recorded.

Scientific Computer System - A computer system designed to process structured mathematics (such as Fast Fourier Transforms), and complex, highly redundant information (such as seismic data, sonar data, and radar), with large, on-line memories and very high-capacity output.

SDLC - Synchronous Data Link Control—IBM's data link control for SNA. Supports a subset of HDLC modes.

SDN - Software-Defined Network.

Security - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations

Service Delivery Point - The location of the physical interface between a network and customer/user equipment

Simplex - Unidirectional communications.

Smart Box - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

SNA - Systems Network Architecture—Seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

Software - Computer programs

Supplies - Includes materials associated with the use of operations of computer systems, such as printer paper, keypunch card, disk packs, and tapes.

Switched Circuit - Temporary connection between two network stations established through dial-up procedures.

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations.

Systems Analyst - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

Systems House - Vendor that acquires, assembles, and integrates hardware and software into a total system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

Systems Integrator - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems which may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

T1 - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

TDM - Time Division Multiplexing—A multiplexing method that interleaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

Token Passing - Local-area network protocol which allows a station to transmit only when it has the "token," an empty slot on the carrier.

TOP - Technical Office Protocol—Protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

Turnkey System - System composed of hardware and software integrated into a total system designed to fulfill completely the processing requirements of a single application.

Twisted-Pair Cable - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

Voice-Grade - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system, nominally a 4 KHz user.

VTAM - Virtual Telecommunications Access Method—Host-resident communications software for SNA networks.

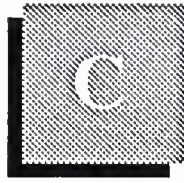
WORM - Write-Once, Read-Many—A type of disk that can be created one time. Once written on, the disk can only be read—otherwise data will be destroyed.

Write-Once - A type of disk that can be created one time. Once written on, the disk can only be read. It cannot be rewritten.

E

Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures are then categorized according to the users' perception of the purchase.



Glossary of Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System.
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement.
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOMatic DIGital Network of the Defense Communications System.
AUTOSEVOCOM	AUTOMatic SEcure VOice COMmunications Network.
AUTOVON	AUTOMatic VOice Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C ²	Command and Control.
C ³	Command, Control, and Communications.
C ⁴	Command, Control, Communications, and Computers.
C ³ I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System.
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program.
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act.
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

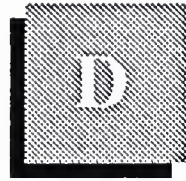
OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B**General and Industry Acronyms**

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	BELL Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultatif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processor Unit.
DMBS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasable Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.



Policies, Regulations, and Standards

A

OMB Circulars	A-11	Preparation and Submission of Budget Estimates.
	A-49	Use of Management and Operating Contracts.
	A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
	A-76	Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
	A-109	Major Systems Acquisitions.
	A-120	Guidelines for the Use of Consulting Services.
	A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.
	A-123	Internal Control Systems.
	A-127	Financial Management Systems.
	A-130	Management of Federal Information Resources.
	A-131	Value Engineering.

B

GSA Publications	The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.
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C

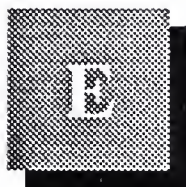
DoD Directives	DD-5000.1	Major System Acquisitions.
	DD-5000.2	Major System Acquisition Process.
	DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
	DD-5000.31	Interim List of DoD-Approved High-Order Languages.
	DD-5000.35	Defense Acquisition Regulatory Systems.
	DD-5200.1	DoD Information Security Program.
	DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.

DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
DD-7920.1	Life Cycle Management of Automated Information (AIS).
DD-7920.2	Major Automated Information Systems Approval Process.
DD-7935	Automated Data Systems (ADS) Documentation.

D**Standards**

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
CCITT G.711	International PCM standard.
CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
DEA-1	Proposed ISO standard for data encryption based on the NBS DES.
EIA RS-170	Monochrome video standard.
EIA RS-170A	Color video standard.
EIA RS-464	EIA PBX standards.
EIA RS-465	Standard for Group III facsimile.
EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
FED-STD 1041	Equivalent to FIPS 100.
FED-STD 1061	Group II Facsimile Standard (1981).
FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
FED-STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
FIPS 46	NBS Data Encryption Standard (DES).
FIPS 81	DES Modes of Operation.
FIPS 100	NBS Standard for packet-switched networks; subset of 1980 CCITT X.25.
FIPS 107	NBS Standard for local area networks, similar to IEEE 802.2 and 802.3.

FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local area networks.
IEEE 802.3	Local area network standard similar to Ethernet.
IEEE 802.4	OSI-compatible standard for token-bus local area networks.
IEEE 802.5	Local area networks standard for token-ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.
MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange.
X.21	CCITT Standard for interface between DTE and DCE for synchronous operation on public data networks.
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
X.75	CCITT standard for links that interface different packet networks.
X.400	ISO Application-level standard for the electronic transfer of messages (electronic mail).



Related INPUT Reports

A

Annual Market Analyses

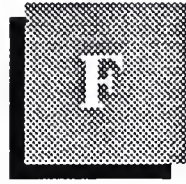
- *Procurement Analysis Reports, GFY 1991-1996*

B

Market Reports

- *Federal Computer Security Market, 1991-1996*
- *Federal Large-Scale Systems Markets, 1988-1993*
- *Federal Software and Related Services Market, 1991-1996*
- *Federal Midsize Systems Market, 1988-1993*
- *Federal Systems Integration Market, 1991-1996*
- *Federal Processing Services/Systems Operations Market, 1991-1996*
- *Federal Telecommunications Market, 1990-1995*
- *Federal Office Information Systems Market, 1988-1993*
- *Federal Microcomputer Market, 1989-1994*
- *NASA Information Systems Market*
- *Department of Veterans' Affairs Information Systems Market*
- *Federal Geographic Systems Market, 1991-1996*
- *Federal Electronic Imaging Market, 1991-1996*
- *Defense Information Systems Agency Market*

- *Defense Logistics Agency Information Services Market*
- *Uncompensated Overtime*
- *Federal Anti-Drug Program*
- *GSA Schedule Practices*



Questionnaires

Although the period of interest for the 1991 update to this report covers GFY 1991-1996, data that is still timely has been incorporated from earlier versions released in 1987, 1988, and 1990. All questionnaire survey vehicles that were used to generate exhibit material for this report are included in this appendix. The questionnaire structures and definitions used in the earlier studies have been annotated for consistency with INPUT's current categories of professional services products and services.

A

1990 Case Study Questionnaires

1. Definitions

For the purposes of this study INPUT defined Professional Services to encompass the following categories of vendor-supplied consulting, education and training, software development, and systems operations functions:

- *Software Development*—Development of a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, software documentation, and software maintenance.
- *Education and Training*—Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.
- *Consulting Services*—Information systems and/or services management consulting, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

2. Federal Professional Services Case Study—Agency Questionnaire, 1990-1995

Program Name: _____
 Department: _____
 Branch/Office: _____
 Agency: _____

1. Please describe the mission problem/function that this professional services contract was to solve/fulfill? **(Example:** The agency's existing budget data base ran on equipment that was approximately 15 years old performing only batch applications. The agency had purchased new hardware and now needed to convert existing applications to run in an interactive mode under a new operating system.) **(specify mission):**

2. What major tasks did the contracted professional services vendor perform that were critical to the program's success? **(Example:** Designed new interactive budget data base; converted code from existing applications to run against new data base; conducted training classes for agency MIS personnel; and developed new systems documentation.) **(specify tasks):**

3. Please **specify** the following summary contract and schedule information for this contract:
 - a. Contract type: _____
 - b. Contract value: \$ _____
 - c. Contract duration: _____
 - d. RFP release date: _____
 - e. Bid due date: _____
 - f. Contract award date: _____
 - g. Project completion date: _____
4. For this professional services contract, please **provide** the names of all contractors and functions they were responsible for:

Contractor	Company	Functions
Prime contractor	_____	_____
Subcontractor	_____	_____
Subcontractor	_____	_____
Outside consultant	_____	_____

5. For each professional service listed, indicate contractor responsibility for this contract only: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for service not applicable to this contract*)

Professional Services	Circle All that Apply			
Consulting services	P	S	O	N
Software development	P	S	O	N
Education/Training	P	S	O	N

CONSULTING SERVICES

- 6a. For each type of consulting service listed below, please indicate contractor responsibility in this professional services contract: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Consulting Services	Circle All that Apply			
Systems management consulting	P	S	O	N
Services management consulting	P	S	O	N
Technical project assistance	P	S	O	N
Management project assistance	P	S	O	N
Feasibility analysis	P	S	O	N
Cost-effectiveness trade-off studies	P	S	O	N

- 6b. Enter the total \$ value of the consulting services portion of this contract:
\$_____ (*enter value*)

SOFTWARE DEVELOPMENT

- 7a. Specify the types of applications that were developed or modified for this project; also indicate contractor responsibility for each application: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Specify Software Type	Circle All that Apply			
_____	P	S	O	N
_____	P	S	O	N
_____	P	S	O	N
_____	P	S	O	N

- 7b. Enter the total \$ value of the software development portion of this contract:
\$_____ (*enter value*)

- 7c. For each software development service listed below, please indicate contractor responsibility in this professional services contract: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Software Development Services	Circle All that Apply			
User requirements definition	P	S	O	N
Systems design	P	S	O	N
Contract programming	P	S	O	N
Software documentation	P	S	O	N
Other (<i>specify</i>): _____	P	S	O	N

EDUCATION AND TRAINING

- 8a. Please estimate the total \$ value of the education/training portion of this contract:
\$ _____ (*enter value*)

- 8b. Circle which types of contractors had responsibility for education/training services for this contract:
(*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)
(*circle all that apply*) P S O N

- 8c. Please *indicate* what types of education/training services were provided as part of this contract:

Education/Training Services	Check All that Apply
Computer-Aided Instruction (CAI)	<input type="checkbox"/>
Computer-Based Education (CBE)	<input type="checkbox"/>
Vendor Instruction of User Personnel in Operations	<input type="checkbox"/>
Vendor Instruction of User Personnel in Programming	<input type="checkbox"/>
Vendor Instruction of User Personnel for Maintenance	<input type="checkbox"/>
Other Documentation Services	<input type="checkbox"/>
Other (<i>specify</i>): _____	

- 9a. *Indicate* any additional services that were provided through this professional services contract, and also please indicate contractor responsibility: (*circle P for Prime Contractor; S for Subcontractor; and O for Other*):

Specify Additional Services	Circle All that Apply		
_____	P	S	O
_____	P	S	O
_____	P	S	O

- 9b. Estimate the \$ value of any additional services provided by the contractors of this professional services contract:
\$ _____ (*enter value*)

10. How would you rate your agency's overall satisfaction with the results of this professional services contract?
(use a 1-5 scale: where 5=extremely satisfied; and 1=not satisfied at all)

(circle one) 1 2 3 4 5

Additional comments:

11. What funding was originally appropriated for this contract?

\$ _____ (specify amount)

- 12a. Did the scope of this project change from the contract award date? (check one)

Yes ☐ No ☐ (go to Question 14)

- 12b. If Yes, how was this issue resolved with the contractor?

(Please explain)

13. Please *detail* the current status of this professional services contract:

GENERAL PROFESSIONAL SERVICES QUESTIONS

- 14a. In your opinion, has changing technology impacted vendor performance in professional services contracts?
(check one)

Yes ☐

No ☐

No Opinion ☐ (go to Question 16a)

- 14b. Please *explain* why or why not:

- 15a. Systems engineering and technical assistance (SETA) contracting is often used to acquire professional services. Do you think this is the best contracting approach agencies should use in acquiring professional services from vendors? (*check one*)

Yes ☐

No ☐

No Opinion ☐ (*go to Question 17*)

- 15b. Why?

16. What types of applications are normally contracted by your agency or organization to a professional services vendor?

- 17a. In your opinion, what characteristics have prevailed in poorly performed professional services contracts? (*Please explain*)

- 17b. What characteristics contribute to a satisfactorily performed professional services contract? (*Please explain*)

3. Federal Professional Services Case Study—Contractor Questionnaire, 1990-1995

Program Name: _____
 Department: _____
 Branch/Office: _____
 Agency: _____

1. Please describe the mission problem/function that this professional services contract was to solve/fulfill? **(Example:** The agency's existing budget data base ran on equipment that was approximately 15 years old performing only batch applications. The agency had purchased new hardware and now needed to convert existing applications to run in an interactive mode under a new operating system.) **(specify mission):**

2. What major tasks did the contracted professional services vendor perform that were critical to the program's success? **(Example:** Designed new interactive budget data base; converted code from existing applications to run against new data base; conducted training classes for agency MIS personnel; and developed new systems documentation.) **(specify tasks):**

3. Please **specify** the following summary contract and schedule information for this contract:

- a. Contract type: _____
 b. Contract value: \$ _____
 c. Contract duration: _____
 d. RFP release date: _____
 e. Bid due date: _____
 f. Contract award date: _____
 g. Project completion date: _____

4. For this professional services contract, please **provide** the names of all contractors and functions they were responsible for:

Contractor	Company	Function
Prime contractor	_____	_____
Subcontractor	_____	_____
Subcontractor	_____	_____
Outside consultant	_____	_____

5. For each professional service listed, indicate contractor responsibility for this contract only: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for service not applicable to this contract*)

Professional Services**Circle All that Apply**

Consulting services	P	S	O	N
Software development	P	S	O	N
Education/Training	P	S	O	N

CONSULTING SERVICES

- 6a. For each type of consulting service listed below, please indicate contractor responsibility in this professional services contract: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Consulting Services**Circle All that Apply**

Systems management consulting	P	S	O	N
Services management consulting	P	S	O	N
Technical project assistance	P	S	O	N
Management project assistance	P	S	O	N
Feasibility analysis	P	S	O	N
Cost-effectiveness trade-off studies	P	S	O	N

- 6b. Enter the total \$ value of the consulting services portion of this contract: \$ _____ (*enter value*)

SOFTWARE DEVELOPMENT

- 7a. Specify the types of applications that were developed or modified for this project; also indicate contractor responsibility for each application: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Specify Software Type**Circle All that Apply**

_____	P	S	O	N
_____	P	S	O	N
_____	P	S	O	N
_____	P	S	O	N

- 7b. Enter the total \$ value of the software development portion of this contract:
\$ _____ (*enter value*)

- 7c. For each software development service listed below, please indicate contractor responsibility in this professional services contract: (*circle P for Prime Contractor; S for Subcontractor; O for Other; and N for not applicable to this contract*)

Software Development Services**Circle All that Apply**

User requirements definition	P	S	O	N
Systems design	P	S	O	N
Contract programming	P	S	O	N
Software documentation	P	S	O	N
Other (<i>specify</i>): _____	P	S	O	N

EDUCATION AND TRAINING

- 8a. Estimate the total \$ value of the education/training portion of this contract:

\$ _____ (enter value)

- 8b. Circle which types of contractors had responsibility for education/training services for this contract: (circle
- P*
- for Prime Contractor;
- S*
- for Subcontractor;
- O*
- for Other; and
- N*
- for not applicable to this contract) (circle all that apply) P S O N

- 8c. Please indicate what types of education/training services were provided as part of this contract:

Education/Training Services Check All that Apply

Computer-Aided Instruction (CAI) ☐Computer-Based Education (CBE) ☐Vendor Instruction of User Personnel in Operations ☐Vendor Instruction of User Personnel in Programming ☐Vendor Instruction of User Personnel for Maintenance ☐Other Documentation Services ☐

Other (specify): _____

- 9a. Please indicate any additional services that were provided through this professional services contract, and also please indicate contractor responsibility: (circle
- P*
- for Prime Contractor;
- S*
- for Subcontractor; and
- O*
- for Other):

Specify Additional Services Check All that Apply

_____ P S O

_____ P S O

_____ P S O

- 9b. Estimate the \$ value of any additional services provided by the contractors of this professional services contract:

\$ _____ (enter value)

10. How would you rate the agency's overall satisfaction with the results of this professional services contract?

(use a 1-5 scale: where 5=extremely satisfied; and 1=not satisfied at all)

(circle one) 1 2 3 4 5

Additional comments: _____

11. What funding was originally appropriated for this contract?

\$ _____ (specify amount)

12a. Did the scope of this project change from the contract award date? (*check one*)

Yes ☐ No ☐ (*go to Question 14*)

12b. *If Yes*, how was this issue resolved with the agency? (*Please explain*)

13. Please *detail* the current status of this professional services contract:

GENERAL PROFESSIONAL SERVICES QUESTIONS

14a. In your opinion, has changing technology impacted vendor performance in professional services contracts? (*check one*)

Yes ☐ No ☐ No Opinion ☐ (*go to Question 16a*)

14b. Please *explain* why or why not:

15a. Systems engineering and technical assistance (SETA) contracting is often used to acquire professional services. Do you think this is the best contracting approach agencies should use in acquiring professional services from vendors? (*check one*)

Yes ☐ No ☐ No opinion ☐ (*go to Question 17*)

15b. Why?

16. What types of applications do agencies normally contract to a professional services contractor?

- 17a. In your opinion, what characteristics have prevailed in poorly performed professional services contracts?
(Please explain)

- 17b. What characteristics contribute to a satisfactorily performed professional services contract?
(Please explain)

B

1988 Questionnaires 1. Definitions

For the purposes of this study, INPUT defined Professional Services to include the following categories of contractor products and services:

- *Consulting Services*—Includes information systems and/or services management consulting, program assistance (technical and/or management), feasibility analysis, and cost-effective trade-off studies.
- *Education and Training*—Services related to information systems and services for the users, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming, and software maintenance. Common government education and training services that are contracted to vendors include: training programs, books and manuals, seminars, and automated training systems.
- *Programming and Analysis*—Also called software development services, includes: system design, contract or custom programming, code conversion, independent verification and validation, benchmarking, and software maintenance.

2. Federal Professional Services Market—Agency Questionnaire, 1988-1993

QU: 1 What federal procurement trends does your agency foresee affecting its need/use for professional services contractors?

QU: 2 What specific procurement regulations impact the use of professional services contractors?

QU: 3 What suggestions do you have for vendors who team with other vendors on professional services bids in the federal market?

QU: 4 What impact has federal personnel policies had on how your agency meets its information technology requirements?

QU: 5 Which economic and regulatory factors will impact federal information technology requirements for professional services over the next few years?

QU: 6 Do you believe agencies will use more multiple award BOAs to acquire professional services during the next few years and why?

QU: 7 In rank order, please specify the most important bid selection criteria that agencies should use in evaluating contractors' proposals to provide professional services? (indicate the most important criterion, first; the next important criterion, second; etc.)

Specify Criteria

_____ (rank 1)

_____ (rank 2)

_____ (rank 3)

_____ (rank 4)

QU: 8 Which contract type does your agency prefer to use to acquire professional services and why?

3. Federal Professional Services Market—Industry Questionnaire, 1988-1993

QU: 1a Does your company now provide or plan to provide professional services to the federal government?

Yes_____ No_____

QU: 1b What types of systems or services do you now provide or plan to provide?

	Current		Future		
	Yes	No	Yes	No	Why?
Consulting Services	_____	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____	_____
Software Development	_____	_____	_____	_____	_____

QU: 1c What other categories, if any, of professional services would you add to our list?

QU: 1d What are your current and future activities in those categories?

QU: 2 What percent of your total professional services business was done with the federal government last year?

QU: 3a What percent of your federal professional services revenue was generated in each of the following categories last year?

	Percent Revenue Last Year
Consulting Services	_____
Education/Training	_____
Software Development	_____
Other	_____

QU: 3b What was your company's total professional services revenue in dollars last fiscal year - both commercial and government?

QU: 3c According to your company's total professional services revenue, do you rank your company within the top 10 professional services vendors serving the federal market?

Yes____ No____

QU: 3d What is your approximate rank? _____

QU: 3e What was your company's total corporate revenue in dollars for your most recent fiscal year? \$ _____ FY _____

QU: 4a Do you anticipate any change in the amount of professional services you will provide to the federal government in the next two to five years?

Yes____ No____

QU: 4b (If Yes) In which of the following categories do you expect either an increase or decrease in the next two to five years, and can you estimate by what percent? This is federal government only.

	Increase	Decrease	No Change	Percent Change
Consulting Services	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____
Software Development	_____	_____	_____	_____

QU: 5 In your opinion, what technical factors will increase or decrease federal government spending on professional services in the next two to five years?

QU: 6a In your opinion, which agencies provide the most attractive opportunities for your company in providing professional services to the government?

QU: 6b Do you provide professional services to any of these agencies under Multiple Award Basic Ordering agreements?

Which Agencies? _____

QU: 7 Are you now qualified or do you plan to become qualified in Ada programming?
Qualified Now _____ Planning To Be _____

QU: 8 What differences do you see between commercial markets and the federal market for your products and services?

QU: 9 What industry trends will affect the federal professional services market?

Why? _____

QU: 10 Do you expect the government to increase its SETA contracting over the next five years?

Why? _____

QU: 11 Which of the following contract types do you expect to dominate the federal professional services market over the next five years?

Cost Plus_____ Fixed Price_____ Mix of Both_____

Other (specify): _____

Why? _____

QU: 12 What are the implications of these contracting trends on professional services vendors, particularly as it relates to pricing approaches?

QU: 13 What effect will the government's growing use of packaged software have on the professional services market?

QU: 14 When you complete a professional services contract with the government for design, programming and analysis, is follow-on support usually transferred in-house or left with you or another vendor?

In-House _____

Out-of-House Self _____

Out-of-House Other _____

QU: 15a Have you ever lost any professional services contracts to government in-house staffs?

Yes _____ No _____

QU: 15b Why?

QU: 15c What types of applications?

QU: 16 Have you ever acquired a contract for support functions that were previously done in-house by the government?

Yes ____ No ____

QU: 17 Could you identify those non-technical factors that would have the greatest impact on government professional services acquisitions?

QU: 18 How would you rate the importance of the following professional services vendor characteristics in winning a bid?

- 1 - Definitely not important
- 2 - Somewhat important
- 3 - Important
- 4 - Very important
- 5 - Crucial

Characteristics	Rate				
1. Application Functional Experience	1	2	3	4	5
2. Staff Experience	1	2	3	4	5
3. Software Development Experience	1	2	3	4	5
4. Support Functions	1	2	3	4	5
5. Federal Contract Experience	1	2	3	4	5
6. Agency Experience	1	2	3	4	5
7. Price	1	2	3	4	5
8. Other	1	2	3	4	5

QU: 19 On a scale of 1 to 5, with 5 being the most satisfied, how would you rate the government's level of satisfaction with professional services vendors in the past regarding:

Characteristics	Rate				
a. Quality of Work	1	2	3	4	5
b. Quantity of Work	1	2	3	4	5
c. Responsiveness to Agency Needs	1	2	3	4	5
d. Project Management	1	2	3	4	5
e. Development Visibility	1	2	3	4	5
f. Delivery Schedule(s)	1	2	3	4	5
g. Cost	1	2	3	4	5

QU: 20 What do you believe vendors need to do over the next five years to make their products and professional services more valuable to the federal government?

Additional Comments:

C

1987 Questionnaires 1. Definitions

For the purposes of this survey, INPUT defined "Professional Services" - "for ADP" as follows:

- *Consulting Services*—Information systems and/or services management consulting, program assistance (technical and/or management) feasibility analysis, and cost/effectiveness trade-off studies.
- *Software Development*—Includes systems design, (contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking, and software maintenance.
- *Education/Training Services*—Products and/or services related to ISS for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming, and maintenance.

2. Federal Professional Services—Agency Questionnaire, 1987-1992

QU: 1 Have you used any of the following professional services categories within the past year? Proposed future use?

	Current		Future		
	Yes	No	Yes	No	Why?
Consulting Services	_____	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____	_____
Software Development	_____	_____	_____	_____	_____

QU: 2 What percent of your total professional services budget is currently spent on each of the following categories?

	Percent Spent Now
Consulting Services	_____
Education/Training	_____
Software Development	_____
Other	_____
Total	_____

QU: 3 What is your annual expenditure for professional services?

QU: 4a Do you anticipate any change in the amount of professional services you will use in the next two to five years?

Yes _____ No _____

(If Yes, proceed to question 4b) (If no, proceed to question 5a)

QU: 4b In which of the following categories do you expect either an increase or decrease in the next two to five years, and can you estimate by what percent?

	Increase	Decrease	No Change	Percent Change
Consulting Services	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____
Software Development	_____	_____	_____	_____

QU: 5a What types of applications have been contracted out to professional services vendors in the past year?

QU: 5b What additional applications do you foresee in the next five years?

QU: 6a In your opinion, is your agency going to continue to utilize custom software in its computer operations? (software development).

Yes _____ No _____

QU: 6b How many of these applications are equivalent to commercial software applications and could be accomplished by minor modifications to a commercial software package?

QU: 6c How many custom software applications are unique to the government agency only and do not have a commercial equivalent available for use?

QU: 6d Is your agency using or planning to use commercial or customized Data Base Management Systems (DBMS)?

Yes _____ No _____

For what types of applications? _____

QU: 7 Which computer language standards are in effect now or might be applied in the future to your agency's use of professional services?
(Instructions: For each standard, give which professional services it is used for and whether it is used currently or will be in the future.)

Language Standard	Professional Services Applications Use	Current Use	Future Use
1. _____			
2. _____			
3. _____			

QU: 8a What types of education and training requirements does your agency have?

QU: 8b Have they increased or decreased over the last five years?

Increase_____ Decrease_____

QU: 8c Will they increase _____, decrease _____, or stay about the same _____ over the next five years?

QU: 8d Where will the funding be obtained or diverted to for supporting these educational requirements?

QU: 9 How would you rate the importance of the following professional services vendor characteristics in winning a bid?

- 1 - Definitely not important
- 2 - Somewhat important
- 3 - Important
- 4 - Very important
- 5 - Crucial

QU: 9 (con't) Characteristics Rank

1. Application Functional Experience	1	2	3	4	5
2. Staff Experience	1	2	3	4	5
3. Software Development Experience	1	2	3	4	5
4. Support Functions	1	2	3	4	5
5. Federal Contract Experience	1	2	3	4	5
6. Agency Experience	1	2	3	4	5
7. Price	1	2	3	4	5
8. Other	1	2	3	4	5

QU: 10 On a scale of 1 to 5, with 5 being the most satisfied, how would you rate your level of satisfaction with professional services vendors in the past regarding:

Characteristics	Rank				
a. Quality of Work	1	2	3	4	5
b. Quantity of Work	1	2	3	4	5
c. Responsiveness to Agency Needs	1	2	3	4	5
d. Project Management	1	2	3	4	5
e. Development Visibility	1	2	3	4	5
f. Delivery Schedule(s)	1	2	3	4	5
g. Cost	1	2	3	4	5

QU: 11a What type of contract does your agency prefer for professional services?

Cost Plus_____ Fixed Price_____ Mix of Both_____

Other (specify): _____

QU: 11b Are you presently using Multiple Award Basic Ordering Agreements? _____

Which Services? _____

QU: 12 When a professional services contract for design, programming and analysis is completed, do you usually transfer continued support in-house or leave support with the contractor?

In-House_____ Out of House_____

QU: 13a Do you plan to convert any professional services contracts to in-house?

Yes_____ No_____

QU: 13b Why? _____

QU: 14a Do you plan to convert any in-house support functions to outside contractor support?

Yes_____ No_____

QU: 14b Why? _____

QU: 14c Which applications? _____

QU: 15a Could you identify those factors (non-technical) that would have the greatest impact on your agency's professional services plans?

QU: 15b Have any federal personnel policies regarding ADP staff had an influence on your use of professional services?

QU: 16 What technological changes might alter the way your agency accomplishes its professional services plans?

QU: 17 What would you like to see vendors do in the next two to five years to make their services more valuable?

QU: 18a Which type of vendor or organization appears more desirable for performing professional services?

Mainframe Manufacturer _____

Professional Services Company _____

Not-for-Profit _____

Software Products Vendor _____

Other (specify): _____

QU: 18b Why? _____

QU: 19 How have vendor "teaming" arrangements served to satisfy the federal agency needs for professional services?

3. Federal Professional Services—Industry Questionnaire, 1987-1992

QU: 1a Does your company now provide or plan to provide professional services to the federal government?

Yes ____ No ____ (If No, close interview)

QU: 1b What types of systems or services do you now provide or plan to provide?

	Current		Future		Why?
	Yes	No	Yes	No	
Consulting Services	____	____	____	____	_____
Education/Training	____	____	____	____	_____
Software Development	____	____	____	____	_____

QU: 2 What percent of your total professional services business was done with the federal government last year? _____

QU: 3a What percent of your federal professional services revenue was generated in each of these categories last year?

	% spent last year
Consulting Services	_____
Education/Training	_____
Software Development	_____
Other	_____

QU: 3b What was your company's total professional services revenue in dollars last fiscal year—both commercial and government? _____

QU: 3c According to your company's total professional services revenues, do you rank your company within the top 10 professional services vendors serving the federal market? Yes ____ No ____

QU: 3d What is your approximate rank? _____

QU: 3e What was your company's total corporate revenue in dollars for your most recent fiscal year? \$ _____ FY _____

QU: 4a Do you anticipate any change in the amount of professional services you will provide to the federal government in the next 2 to 5 years?
Yes _____ No _____

QU: 4b (If Yes)

In which of the following categories do you expect either an increase or decrease in the next 2 to 5 years, and can you estimate by what percent? This is federal government only.

	Increase	Decrease	No Change	% Change
Consulting Services	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____
Software Development	_____	_____	_____	_____

QU: 5 In your opinion, what technical factors will increase or decrease federal government spending on professional services in the next 2 to 5 years?

QU: 6 How would you rank the importance of the following professional services vendor characteristics in winning a bid?

- 1 - Definitely not important
- 2 - Somewhat important
- 3 - Important
- 4 - Very important
- 5 - Crucial

Characteristics	Rank				
Application Functional Experience	1	2	3	4	5
Staff Experience	1	2	3	4	5
Hardware Experience	1	2	3	4	5
Software Development Experience	1	2	3	4	5
Support Functions	1	2	3	4	5
Federal Contract Experience	1	2	3	4	5
Agency Experience	1	2	3	4	5
Price	1	2	3	4	5
Other: _____	1	2	3	4	5

QU: 7 Are you now qualified or do you plan to become qualified in Ada programming? Qualified Now _____ Planning To Be _____

QU: 8 In your opinion, which agencies provide the most attractive opportunities for your company in providing professional services to the government?

QU: 9 What differences do you see between commercial markets and the federal market for your products and services?

QU: 10 On a scale of 1 to 5, with 5 being the most satisfied, how would you rate the government's level of satisfaction with professional services vendors in the past regarding:

Characteristics	Rating				
a. Quality of Work	1	2	3	4	5
b. Quantity of Work	1	2	3	4	5
c. Responsiveness to Agency Needs	1	2	3	4	5
d. Project Management	1	2	3	4	5
e. Development Visibility	1	2	3	4	5
f. Delivery Schedule(s)	1	2	3	4	5
g. Cost	1	2	3	4	5

QU: 11 What type of contract does your company prefer for the professional services category you provide:

Cost Plus _____ Fixed Price _____
 Mix _____ Other (specify) _____

QU: 12 Which of your company's professional services or product capabilities do you think agencies find most attractive?

QU: 13 When you complete a professional services contract with the government for design, programming, and analysis, is follow-on support usually transferred in-house or left with you or another vendor?

In House _____
Out-Of-House Self _____
Out-Of-House Other _____

QU: 14a Have you ever lost any professional services contracts to government in-house staffs? Yes _____ No _____

QU: 14b Why? _____

QU: 14c What types of applications? _____

QU: 15 Have you ever acquired a contract for support functions which were previously done in-house by the government?
Yes _____ No _____

QU: 16 Could you identify those non-technical factors that would have the greatest impact on government professional services acquisitions?

QU: 17 What do you believe vendors need to do over the next 5 years to make their products and professional services more valuable to the federal government?

